ATLANTIC TESTING LABORATORIES, LIMITED

520 North Bedford St.
Manchester, N.H. 03104
(603) 669-4828

Box 29
Canton, N.Y. 13617
(315) 386-4578

February 26, 1988

U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254-9149

Attn: Mr. Ron DeFilippo

Re: New Haven Harbor Improvements Project
New Haven, CT
Contract No. 87-89 DACW 33-85-D-0011
Delivery Order No. 0022
ATL Report No. CD024-1-1-88

Gentlemen:

In accordance with Delivery Order No. 0022 dated 87, June 25, attached is one final copy of our Engineering Report for the subsurface investigation performed at New Haven, CT.

By copy of this letter we are also transmitting two copies of this report to the Chief of the Geotechnical Engineering Branch.

If you have any questions or comments, please do not hesitate to contact our office.

Respectfully submitted,

Gregory R. Hargrave

Gregory R. Hargrave
Geologist

GRH/dh

attchs.

Section 1

New Haven Harbor Improvements Project

New Haven, CT

Contract No. 87-89 DACW 33-85-D-0011

Contracting Officer:

Thomas Rhen, Colonel, CE, Division Engineer

Delivery Order No. 0022

Prepared for: U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254-9149

Prepared by: Atlantic Testing Laboratories, Limited
P.O. Box 29
Canton, New York 13617

ATL Report No.: CD024-1-1-88

30 December 87

Section 2

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Section 2

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Section 3

SCOPE OF INVESTIGATION

a. Delivery Order No. 0022

CHECKED BOX APPLIES			PAGE 1 OF 2
	[X] ORDER FOR SUPPLIES OR SERVICES	[ ] REQUEST FOR QUOTATIONS NO. RETURN COPY(IES) OF THIS QUOTE BY *(THIS IS NOT AN ORDER. See DD Form 1155r)*	5 CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1 DO

1. CONTRACT/~~PURCH~~ ORDER NO.	2. DELIVERY ORDER NO.	3. DATE OF ORDER	4. REQUISITION/PURCH REQUEST NO.
DACW33-85-D-0011	0022	87 JUN 25	GEB 87-79

6. ISSUED BY: ~~CODE~~
Department of the ~~Army~~
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254-9149
BUYER/SYMBOL: Apidianakis/CENED-CT-C Telephone: Area Code 617/647-8207

7. ADMINISTERED BY: *(If other than 6)* CODE

8. DELIVERY FOB
[X] DEST
[ ] OTHER
(See Schedule if other)

9. CONTRACTOR/QUOTER CODE FACILITY CODE

NAME AND ADDRESS
Atlantic Testing Laboratories, ~~Inc.~~ Ltd.
P. O. Box 29
Canton, New York 13617

10. DELIVER TO FOB POINT BY:
In accordance with Paragraph 7 of Attachment

11. CHECK IF BUSINESS IS
[ ] SMALL
[ ] SMALL DISADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS
NET

13. MAIL INVOICES TO: Finance & Accounting Officer at Issuing Office

14. ~~SHIP~~ Services for: CODE
U. S. Army Engineer Division, New England
ATTN: Geotechnical Engineering Branch
424 Trapelo Road
Waltham, Massachusetts 02254-9149

15. PAYMENT WILL BE MADE BY: CODE
Finance and Accounting Officer at Issuing Office

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16. TYPE OF ORDER
DELIVERY [X] This delivery order is subject to instructions contained on this side of form only and is issued ~~XXXXXXXXXXXXXXXX~~ in accordance with and subject to terms and conditions of above numbered contract.
PURCHASE [ ] Reference your furnish the following on terms specified herein, including, for U.S. purchases.
General Provisions of Purchase Order on DD Form 1155r *(EXCEPT CLAUSE NO. 12 APPLIES ONLY IF THIS BOX* [ ] *IS CHECKED, AND NO. 14 IF THIS BOX* [ ] *IS CHECKED)*; special provisions ; and delivery as indicated. This purchase is negotiated under authority of 10 USC 2304(a)(3) or as specified in the schedule if within U.S., its possessions or Puerto Rico; if otherwise under 2304(a)(6).
[ ] *If checked, Additional General Provisions apply; Supplier shall sign "Acceptance" on DD Form 1155r and return* copies.

SBSA
STATUS
GEB
AE/PS COOR
EJA

17. ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
96X3121 General Investigations
AF201055400GA00 (MD) $109,408.00

18. ITEM NO	19. SCHEDULE OF SUPPLIES/SERVICES	20. QUANTITY ORDERED/ ACCEPTED *	21. UNIT	22. UNIT PRICE	23. AMOUNT
	Furnish necessary equipment and personnel to perform a seismic survey and borings for the proposed dredging in the New Haven Harbor channel.	APPROX.			ESTIMATED
~~A.1~~ 1.1	Geologist	142	HR	$40.00	$5,680.00
1.3	Per Diem - Overnight Stay	15	DAY	45.00	675.00
1.4	Mileage from Waltham, MA and Return	750	MI	.35	262.50
2.1	Geotechnical Report	1	JOB	60% of Line Item 1.1	3,408.00
		APPROX.			ESTIMATED

* *If quantity accepted by the Government is same as quantity ordered, indicate by ✓ mark. If different, enter actual quantity accepted below quantity ordered and encircle.*

24. UNITED STATES OF AMERICA
BY: THOMAS A. RHEN, Colonel, CE
Division Engineer
~~CONTRACTING/ORDERING OFFICER~~

25. TOTAL ~~ESTIMATED~~ $109,408.00
29. DIFFERENCES

26. QUANTITY IN COLUMN 20 HAS BEEN:
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED
DATE SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

27. SHIP. NO.
[ ] PARTIAL [ ] FINAL

28. D.O. VOUCHER NO.

30. INITIALS

31. PAYMENT
[ ] COMPLETE [ ] PARTIAL [ ] FINAL

32. PAID BY

33. AMOUNT VERIFIED CORRECT FOR

34. CHECK NUMBER

35. BILL OF LADING NO.

36. I certify this account is correct and proper for payment.
DATE SIGNATURE AND TITLE OF CERTIFYING OFFICER

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED	40. TOTAL CONTAINERS	41. S/R ACCOUNT NUMBER	42. S/R VOUCHER NO

STANDARD FORM 36 (JULY 1966)
GENERAL SERVICES ADMINISTRATION
FPR (41 CFR) 1-16.101

CONTINUATION SHEET

REFERENCE NO. OF DOCUMENT BEING CONTINUED: Delivery Order No. 0022
DACW33-85-D-0011

PAGE 2 OF 2

NAME OF OFFEROR OR CONTRACTOR: Atlantic Testing Laboratories, Ltd.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
3.1	Mobilization and Demobilization	APPROX. 2	JOB	$ 180.00	ESTIMATE $ 360.00
3.2	Mileage from/to Waltham, MA	900	MI	.35	315.00
3.4	Survey Crew	24	DAY	440.00	10,560.00
3.5	Overnight Per Diem	24	DAY	90.00	2,160.00
3.6	Data Reduction & Plotting	1	JOB	100% of Line Item 34	10,560.00
3.7	Standby Time	32	HR	55.00	1,760.00
4.1	Sample Delivery	2	JOB	80.00	160.00
6.1	Mobilization and Demobilization	1	JOB	700.00	700.00
6.2	Mileage from/to Waltham, MA	250	MI	1.15	287.50
10.10	1500 Sq. ft. Barge	11	DAY	1,500.00	16,500.00
10.11	Standby time for 1500 square foot barge	32	HR	115.00	3,680.00
14.1	Drive Sample Boring, 0-50 ft.	215	LF	22.00	4,730.00
18.1	Casing-BX NX Size	65	LF	18.00	1,170.00
18.2	Casing-HX and 6-inch size	150	LF	28.00	4,200.00
22.3	Diamond Core Drilling - NWX size and/or NWM	40	LF	45.00	1,800.00
27.1	Mobilization and Demobilization (reflection) with Floating Plant	1	JOB	2,400.00	2,400.00
27.2	Mileage from/to Waltham, MA	500	MI	1.20	600.00
27.4	Seismic Crew and Equipment	12	DAY	1,650.00	19,800.00
27.5	Overnight Per Diem for Seismic Crew	12	DAY	140.00	1,680.00
27.6	Data Reduction	1	JOB	60% of Line Item 27.4	11,880.00
27.7	Standby Time	34	HR	120.00	4,080.00

ATTACHMENT NO. 1

GEB REQUISITION NO. 87-79 DACW 33-85-D-0011

DELIVERY ORDER NO. 0022

EXPLORATION INSTRUCTIONS

PROJECT: New Haven Harbor Improvement Project

SITE: New Haven, CT

PURPOSE: Determine dredging conditions for channel deepening to 42 ft. MLW and widening from 400 feet to 500 feet in places

1. SCOPE OF INVESTIGATIONS

a. Seismic Work. A seismic survey shall be done to determine depth to bedrock and engineering characteristics of materials to be dredged down to 42 feet MLW. The seismic survey limits shall encompass the entire channel where widening and deepening are designated. The general area is shown on Attachment 2. Detail plans showing the project limits, bottom soundings and survey point locations have been provided to you separately. It is estimated that two seismic lines shall extend along the sides of the channel. Additional cross lines shall be run in the vicinity of the channel bend where rock is expected above proposed dredging depth. The density of data needed to define zones where rock and fill are shallow shall be judged in the field. The lines shall be located according to the coordinate system and Corps of Engineers survey points shown on detail drawings provided separately. The seismic survey shall use MLW as the datum.

b. Borings.

(1) Eleven borings shall be executed in the channel in the approximate positions shown on Attachment 2. The boring program will not be started until after the draft seismic report has been reviewed by the Corps of Engineers. (See completion schedule below.) The final positions and depths of the borings shall be adjusted depending on the results of the seismic survey.

(2) Borings shall be done to a depth of 45 feet MLW. While in overburden continuous drive sample borings with 140 lb. hammer (30 inch drop) and a 2-1/2 inch solid spoon sampler. If refusal is encountered, the boring shall be continued using NWX coring as needed to reach 45 feet MLW. Five feet of bedrock shall be cored whenever encountered above 45 feet MLW.

c. Surveys and Positioning. Exploration points shall be located in accordance with the coordinate system shown on the 1 inch = 200 feet scale maps and the Corps of Engineers survey monument locations provided to you separately. Conventional survey methods and private radio navigation means with trisponders shall be used as appropriate.

2. SITE CONDITIONS

New Haven harbor is 4.5 miles long and varies in width from 1 to 4 miles. Except for dredged areas, depths over about half of the outer harbor are from 15 to 25 feet, and in the inner harbor are less than 6 feet, for the most part. The channel presently is maintained at 35 feet MLW.

Borings are assumed to be in areas where bottom elevations are about 20-25 feet MLW and sediments about 20-25 feet thick overlying rock or till. Sediments may be organic silt, silt and sand. Till may also occur.

The tide in New Haven Harbor is semi-diurnal. At the head of the harbor, the tide has a mean range of 6.3 feet and a mean spring range of 7.2 feet. At the harbor entrance, the mean range of tide is 6.2 feet and the mean spring range is 7.1 feet. Extreme tides in the vicinity of the harbor entrance, due to storm winds and atmospheric pressure, have ranged from more than 2.5 feet below the plane of mean low water to about 12.4 feet above the same datum.

The inner harbor is fairly well protected from storm and wave action by natural land barriers, but the outer harbor, except for the shelter of the breakwaters, is exposed to southerly storms. Morris Cove, on the east side of the outer harbor, affords good anchorage for yachts, but is rough during westerly winds.

Maximum currents at the harbor entrance are 1.4 knots (2.36 fps) on the flood and 0.9 knots (1.52 fps) on the ebb tide. In the entrance channel between the breakwaters, the average current is 0.4 knots (0.68 fps).

The harbor is very active and accommodates very large vessels. The floating plant used for drilling operations should be suitable for the turbulence that is likely to occur. The Coast Guard should be contacted in advance of drilling for information about conditions and regulations relating to working in the harbor.

3. RIGHTS OF ENTRY

The Contractor is responsible for securing rights of entry for all staging operations.

4. COORDINATION

Two weeks before any work in the navigation channel, the U. S. Coast Guard shall be contacted at tel. 203-772-2464. At least 5 days before work initiation and every day thereafter, Ron DeFilippo, Corps of Engineers, shall be contacted at tel 617-647-8175. The alternate point of contact is Mr. Yuri Yatsevitch, tel 617-647-8387. Sample delivery shall be coordinated with the Director, NED Materials & Water Quality Laboratory, tel 617-647-8357/8392.

5. EXPLORATION NUMBERS

The seismic lines shall be numbered beginning with S-1 in order of their completion. Likewise borings lettered A through K shall be renumbered FD-87-1 through FD-87-11. The new exploration designations shall be indicated in the report and shown on a plan of explorations.

6. GOVERNMENT REVIEW

The Government will review the draft submittal of the geotechnical report. Subsequent to such review, the contractor shall accomplish any corrections which may be directed as a result of the Government review.

Government reviews will take approximately ten calendar days from receipt of draft reports. The complete final geotechnical report shall be submitted postmarked no later than seven calendar days after receipt of draft report with Government comments.

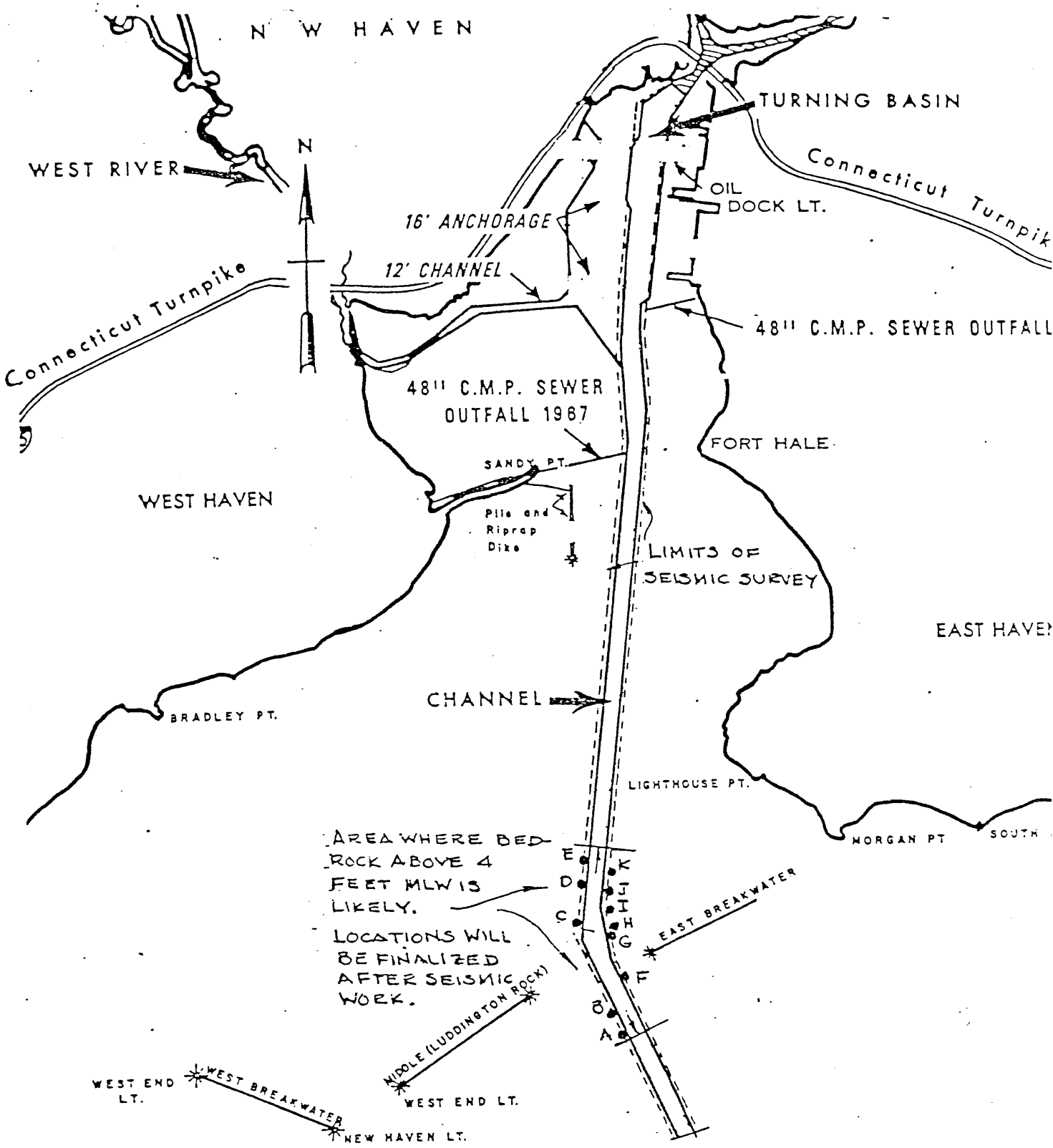
7. COMPLETION SCHEDULE

Seismic services under this delivery order shall start 15 calendar days after receipt of the delivery order. The seismic survey shall be done first. The duration of the field work is estimated to be 12 days. The draft report of the seismic work shall be submitted separately within 10 days to completion of that work. The borings shall commence within two weeks after review of the draft seismic report. Duration of drilling is estimated to be 12 days. The draft report of drilling shall be submitted with 10 days after completion.

8. QUALITY CONTROL

You will be held responsible for the quality of the maps submitted and for all damages caused the Government as a result of your negligence in the performance of any services furnished under the contract.

Although submissions required by your contract are technically reviewed by the Government, it is emphasized that your work must be prosecuted using proper internal controls and review procedures. The certification that the submission has been subjected to your own review and coordination procedures to insure (a) completeness for each discipline commensurate with the level effort required for that submission, (b) elimination of conflicts, errors and omissions, and (c) the overall professional and technical accuracy of the submission. Documents which are significantly deficient in any of these areas will be returned to you for correction and/or upgrading prior to our completing our review. Contract submission dates will not be extended if a resubmission of draft material is required for this reason.



ATTACHMENT 2

b. Project Site

The project site is located in New Haven Harbor, New Haven, CT. The investigation took place on the shipping channel and its margins. The general area of the investigation is shown on Attachment 2 of the Delivery Order.

c. Purpose

The purpose of the investigation was to determine the dredging conditions for channel deepening to 42 ft MLW and widening from 400 ft to 500 ft at selected locations.

d. Scope of Work

Inspection and exploration instruction were provided by the Army Corps of Engineers, New England Division, in Delivery Order No. 0022 and are included in Section of 3a of this report. General inspection and exploration instruction were provided by the Army Corps of Engineers, New England Division, through the contracted Specifications for Services, and Equipment Necessary for Conducting Geotechnical Exploratory Work Various Locations In New England.

The seismic survey work was performed to determine the depth to bedrock and engineering characteristics of the material to be dredged down to 42 feet MLW. The seismic survey limits encompassed the entire channel where widening and deepening are designated. The general area is shown on Attachment 2 of the Delivery Order. Weston Geophysical Corporation was subcontracted to provide equipment and personnel to generate seismic reflection and refraction data, provide radio navigation for the seismic work and provide a report of their findings.

Surveyors from Atlantic Testing Laboratories, Limited provided conventional survey control methods and equipment to check Weston Geophysical Corporation's radio navigation. Atlantic Testing Laboratories Limited also provided locations and elevations for the test borings.

Drilling and sampling was performed by Atlantic Testing Laboratories, Limited personnel using Atlantic Testing Laboratories' equipment. The test borings were sampled using a 1-3/8" I.D. split spoon sampler advanced with a 140 lbs. hammer. The borings were advanced using HX size casing with a 300 lbs. drive hammer. The casing was cleaned using a 3-7/8" roller bit.

The proposed scope of work required eleven borings drilled from a barge in the harbor. Two borings were attempted with one being completed. The borings were attempted from October 28, 1987 to November 12, 1987 using a 40'x 40' barge. Adverse winds and seas prevented continuing the work with the equipment employed. Work was terminated as predicted weather was not favorable.

Section 4

QUALITY CONTROL

a. General Certification Statement

I hereby certify that the records, equipment and procedures mentioned herein were used to perform the subsurface exploration. I also certify that the work was performed in a professional manner and meets the requirements set forth in the Delivery Order. This report has been subject to my review and is both complete and technically accurate.

CERTIFIED January 8, 1988

Spencer F. Thew, P.E./L.S.

b. General Statement

The equipment and procedures used to perform the seismic investigation are summarized in the report prepared by Weston Geophysical Corporation, which is included as a separate enclosure.

c. Records Taken

Pertinent drilling procedures, sampling operations and soil classification data were noted on the following forms provided by the Corps of Engineers:

NED 121	Field Log of Test Boring Summary
NED 58 and 58a	Field Log of Test Boring

A series of logs for each of the borings is included in Section 8 along with location maps.

A summary of daily activities and a telephone log are Table 1 and Table II of Section 5, respectively. A chain of custody log is in Section 6. Safety meeting, reports, NED Form 251 are in Section 7.

d. Equipment Used

All equipment and supplies were provided by Atlantic Testing Laboratories Limited, with the exception of that provided by subcontractors. A listing of pertinent equipment follows:

1. Survey Equipment
   - 2 Wild Heerbrugg T-1 6 minute Theodolite
   - Wild Heerbrugg, NAKI automatic level
   - 15 foot, extendable, fiberglass, stadia rod
   - 2 way radios

2. Drilling Equipment
   - CME 45 drill rig mounted on skids
   - HX size casing with both spin and drive shoes
   - Drill rod, NX taper threaded in 2 ft, 5 ft, and 10 ft lengths used for sampling and advancing 3-7/8" roller bit
   - 300 lbs. hammer and a 140 lbs. safety hammers, the 300 lbs. hammer was used to advance the HX casing and the 140 lbs. safety hammer was used to advance the 2' x 1-3/8" split spoon sampler
   - 2' x 1-3/8" I.D. Split spoon sampler

3. Subcontract Equipment
   - Boat/Operator
   - Barge
   - Crane/Operator
   - Aluminum boat with outboard motor/operator

e. Procedures

1. General Statement

A marine seismic and test boring investigation was to be performed in New Haven Harbor, New Haven CT. Presently the marine seismic section and part of the program has been completed. The details of the marine seismic investigation is a separate attachment to this report.

2. Surveying Procedures

Atlantic Testing Laboratories' surveyors were onsite throughout the duration of the project to locate seismic lines, to set buoys at the boring locations, to determine the actual location as drilled, and to provide tide elevations as the seismic survey and drilling programs proceded.

a. Horizontal Control

The positions of the borings were determined by angle-angle intersections using two Wild Heerbrugg TI Theodolites from control points established by the Corps of Engineers on the Luddington Breakwater (Haven 1977) and at the Old Lighthouse (Old Light). The angles were calculated from coordinates provided by the Corps of Engineers for each boring and control station.

b. Vertical Control

The elevation of the Harbor bottom at each boring was measured from the water surface, the elevation of which was simultaneously determined from a temporary tide gauge installed on the eastern most point of the seawall on the north shore of Morris Creek inlet adjacent to Lighthouse park. The elevation of the tide gauge was determined by a level-run from Benchmark 4 in Morris Cove.

3. Boring Location Procedures

The surveyors located at two different points one on shore, the other on the break water, guided a crew in the Aluminum boat to the site of the proposed boring using 2-way radios. When the person in the aluminum boat was at the site of the proposed boring an anchor attached to a float was dropped over-board. Up to 4 Danforth anchors were used to position the barge over the proposed boring locations.

4. Sampling and Drilling Procedures

Sampling techniques involved retrieving material using the Standard Penetration Test. A 1-3/8" I.D. x 2 ft long split spoon sampler was advanced using a 300 lbs hammer in 3.D. Samples were classified in the field in accordance with ASTM D-2488. Representative samples were taken from each soil sampling run and placed in 16 oz. jars with hermetically sealed lids. Sample jars were labeled using ENG Form 1742.

Section 5

SUMMARY OF ACTIVITIES
AND
TELEPHONE LOG

SUMMARY OF ACTIVITIES

New Haven Survey

TABLE IA

CD024 - NEW HAVEN, CT

SUMMARY OF ACTIVITIES
FOR
SEISMIC SURVEY

Date	Activity
July 28 Tuesday	Survey Crew on site noon - to 6:30 p.m. - Performed New Haven Harbor site inspection to identify monumentation and commence to make arrangements to reestablish missing monumentation - Contacted and received a map of the harbor and discussed the seismic work to be performed with the U.S. Coast Guard
July 29 Wednesday	- Spencer Thew met with the Corps of Engineers regarding the use of radio navigation equipment to position the seismic crew
July 30 Thursday	- Surveyors reviewed prints from the Corps, of the proposed shipping channel. - S. Thew began making arrangements for horizontal positioning using radio navigation equipment per the procedure outlined by the Corps. - Plotted Corps Survey Stations on blueprints of the shipping Channel - Sent Weston Geophysical the prints of the shipping channel, along with desriptions and coordinates of the Corps of Engineer Survey Stations (via Federal Express) - Contacted Hill Bloom of Talmadge Brothers, a fishing and dredging company regarding boats to transport the survey crews. He said that the salmon were spawning in the harbor and that I should contact the Department of Agriculture - John Volk, Aqua Culture 874-0696 before we did any drilling seismic work. - S. Thew began making arrangements for horizontal positioning per the Corps procedure. It was felt more beneficial to use radio navigation equipment in lieu of standard surveying techniques since we could possibly incurr considerable standby time due to interference of shipping traffic and poor visibility due to the weather.
July 31 Friday	- S. Thew and J. Thew were making arrangements for safe and technically sound execution of the seismic investigation (refer to telephone log) .
August 2 Sunday	- Survey crew organize equipment and depart for New Haven

Date	Activity
August 3 Monday	- Survey crew on site 10:00 a.m. to 5:00 p.m. - Began to check monumentation and make arrangements to reestablish damaged points.
August 4 Tuesday	- Survey crew on-site 7:30 a.m. to 5:00 p.m. - Located bookstore with U.S.G.S. maps in New haven bought 3 maps of the New Haven Quad and 3 of the Woodmont Quad - Dave Strack plotted the U.S.C.E. monuments on the U.S.G.S. maps and the U.S.C.G chart Map - Re-establish monumentation - Met with Chief Kurowski of the U.S. Coast Guard about clearance in the barbor, we obtained clearance through August 16th - Located marina for Weston Geophysical to dock their boat at Oyster Point Marina
August 5 Wednesday	- Survey crew on-site 8:00 a.m. to 5:00 p.m. Ran U.S.G.S. elevations from a benchmark on the corner of Howard St. and Fifth St. to the Corps of Engineer monument that we designated as Station #9 on the sewer outfall - Dave Strack in contact with U.S.G.S. office to obtain the benchmark elevation. Connecticut DOT will send the benchmark elevation and the mean low water conversion chart to our Canton Office and our motel (see Telephone Log) - We went out in the harbor to test our radios and determine accessibility to breakwater; radios worked smoothly - Dave Strack met with Superintendent of the New Haven Oil Terminal, they would like our business card to ensure our access to the U.S.C.E. monument - Dave Strack tried to get access to a U.S.C.E. monument on the dock of the VI Power Company but the gate was locked, he spoke to the guard at the gate who said stop by Thursday morning, August 6th and meet with his Superintendent for access to the dock
August 6 Thursday	- Survey Crew on site 8:00 a.m. - 11:00 a.m. - David Strack went to New Haven Oil Terminal and to United Illuminating Power Co. to give them ATL business cards to ensure access to their docks - Left New Haven at 11:00 am
August 9 Sunday	- Loaded equipment and organized paper work - Travel to New Haven

Date	Activity
August 10 Monday	- Survey crew on site 6:30 a.m. - 7:00 p.m. - Weston Geophysical crew on site 8:00 a.m. - 7:00 p.m. - Loaded up boat with seismic equipment - Tried to calibrate the master trisponder with the remote trisponders - Weston couldn't get a distance between Trisponders, concluded that the Master was on a different frequency than the remotes - Ed Rostosky called his office and had another master and remote delivered to New Haven - While waiting for additional equipment Weston representatives worked on their computer onboard the boat and prepared equipment for the project - A trial run was made
August 11 Tuesday	- Survey crew on-site 7:30 a.m. - 7:30 p.m. - Weston Geophysical on site at 8:00 a.m. - 7:30 p.m. - Calibrated trisponders - two out of three were functionable - Headed out to West Breadwater to set trisponder over monument - Monument had been destroyed - Fastened trisponder to the beacon on the East end of the Breakwater - Weston Geophysical made two calibration runs to make sure equipment was working; equipment was functioning properly - Surveyors established coordinates on the beacon by methods of triangulation - David Carlson of survey crew took tidal information
August 12 Wednesday	- Survey crew on site 6:30 a.m. - 4:30 p.m. - Weston Geophysical on site 8:00 a.m. - 5:00 p.m. - Surveyors triangulate to the beacon on the West Breakwater - we did this as a check to insure the coordinates calculated Tuesday were correct - Ran the triangulated data through our computer at Canton office via telephone, The coordinates at home office matched with those D. Strack calculated with field computer - Weston inputed the coordinates that we provided for the beacon on the Breakwater into their computer and were ready to begin recording data - Weston ran the first line with some difficulty since a barge blocked their second approach at the line - Surveyors set up on shore to check locations obtained by radio navigation equipment - David Carlson is taking tidal information and protecting trisponder - After the first line was done we computed, via phone with our home office, the coordinates of the seismic locations to compare them with Weston's coordinates - There was a discrepency between ATL's and Weston's by ~40' in the Northing, ~90' in the Easting - This was due to a bad calibration on one of Weston's remote trisponders - this will be corrected - David Carlson is continuing to recorded Tidal Data and protecting trisponders

Date	Activity
August 13 Thursday	- Survey crew on-site 7:50 a.m. - 4:30 p.m. - Weston Geophysical on site 8:00 a.m. - 6:00 p.m. - Ran 8 seismic lines ranging from 1000' to 6000' in length - Coordinates are checking between standard survey method and radio navigation methods (see computations attached) - Weston finished shooting seismic at 4:30 pm - Weston went out to West Breakwater to replace batteries in trisponder returned at 5:30 pm - Weston ran ~15,000' of line - David Carlson is continuing to recorded Tidal Data and protecting trisponders
August 14 Friday	- Survey crew on site 7:45 a.m. - 5:00 p.m. - Weston Geophysical on site 7:30 a.m. - 4:30 p.m. - Surveyors located 1st mark, last mark and every tenth mark in a run, we then computed coordinates and compared them with those of Westons, on the average we were agreeing within 4' of each other - Weston ran 22,000' of line - Data showed most material was organic with rock at 90-100' below sea level - Surveyors established a point at Fort Nathan Hale and designated as STA-15A - David Carlson is continuing to recorded Tidal Data and protected trisponders
August 15 Saturday	- Survey crew on site 7:30 a.m. - 3:30 p.m. - Weston Geophysical onsite 7:45 a.m. - 3:30 p.m. - Surveyors are checking 1st and last mark in a line - They check very close - within 3' in either direction - Weston ran ~15,000' of line - David Carlson is continuing to recorded Tidal Data and protecting trisponders
August 16 Sunday	- Survey crew on site 6:30 a.m. - 2:30 p.m. - Weston on site 7:00 a.m. - 1:30 p.m. - Weston ran ~15,000' of line - Refraction is now complete up to the 35^{o} corner in the channel - Surveyors are continnuing to check first and last marks of each line - still checking very good - Surveyors also re-established monumentation - David Carlson is continuing to record tidal data and protect trisponders
August 17 Monday	- Survey crew on site 7:45 a.m. - 5:00 p.m. - Weston Geophysical on site 7:45 a.m. - 5:00 p.m. - Surveyors checked first mark on the first line, checked out good in the northing and in the easting - Weston has all refraction completed except for line 13000 which will be completed Tuèsday - Surveyors completed scraping the paint off the sandstone at Fort Hale - David Carlson is continuing to record tidal data and protecting trisponders

Date	Activity
August 18 Tuesday	- Survey crew on site 8:00 a.m. - 4:30 p.m. - Weston Geophysical on site 8:00 a.m. - 5:00 p.m. - J. Thew returned to boat to check refraction and navigation equipment operation - Ran line 13000 picked up bedrock data for the first 9000 ft in the last 4000 ft bedrock was to deep for the phone to pick up. Therefore by lengthening the distance between the air gun and phones gave deeper penetration. Ran the last refraction line - Boat was back in marina at 2:00 p.m. - Refraction gear was unloaded and the reflection gear loaded on the boat - David Carlson is continuing to record tidal data and protecting trisponders
August 19 Wednesday	- Survey crew on site 7:30 a.m. - 6:00 p.m. - Weston Geophysical on site 8:00 a.m. - 6:00 p.m. - Weston assembled the reflection equipment - Set out sparker gear however it took more power than the generator could put out through the 20 amp breaker - needed a thirty amp breaker - Set out bommer board ran line down middle of shipping channel (north to south) - tide is pulling us out at 4 knots would like to travel at two knots - data shows organics - will not penetrate them - Barrels were tossed out to increase the drag slowed us from 3.7 knots to 2.5 knots which is slow enough for good data readings - Ran 6 lines of reflection - Completed about 1/3 of the reflection survey - Weston went to breakwater to change batteries in trisponder - David Carlson is continuing to record tidal data and protecting trisponders
August 20 Thursday	- Survey crew on site 8:00 a.m. - 5:00 p.m. - Weston Geophysical on site 8:00 a.m. - 5:30 p.m. - Set up sparker equipment on our way to the breakwater where we will continue reflection work - Tested the sparker equipment in the channel as we traveled to breakwater - Sparker can sense deeper into organics but not through them - Weston ran line 108 from north to south with the sparker and for comparison and are running line 108 from south to north with the boomer board - David Carlson is continuing to record tidal data and protect trisponders
August 21 Friday	- Survey crew on site 5:00 a.m. - 2:30 p.m. - Weston Geophysical on site 5:00 a.m. - 2:30 p.m. - Survey crew set up at Morgan Point to check reflection locations - Ran ~15000' with the boomer board - David Carlson is continuing to record tidal data and protect trisponders

Date	Activity
August 22 Saturday	- Survey crew on site 6:00 a.m. to 1:00 p.m. - Weston on site 6:00 a.m. to 1:00 p.m. - Finished the reflection survey, dismantled equipment and demobilized

TABLE IB

CD024 - NEW HAVEN, CT

SUMMARY OF ACTIVITIES
FOR
SUBSURFACE EXPLORATION

Date	Activity
October 28 Wednesday	- Surveyors, Geologist, and Drillers mobilized to New Haven on site 10:00am-6:00pm - Surveyors began checking monumentation and making arrangements to re-establish control points on the East Breakwater and Luddington Rock Breakwater which they identified as missing, based on site inspection.
October 29 Thursday	- Surveyors, Geologist, and Drillers onsite 7:30am-5:30pm - 40' x 40' sectional barge with 2 spuds and boat were mobilized - Drillers unloaded equipment in preparation for mounting equipment on barge - Surveyors work at establishing elevation at Morgan Pt. - surveyors went to Coast Guard Station and obtained permission to run elevations from bench mark. Future requests for access to Coast Guard Dock are to be directed to Lt. Commander Murry at (773-2450) - Geologist worked with surveyors in setting control, made arrangements for dockage, check on obtaining weather forecasting information - Held safety meeting in am
October 30 Friday	- Surveyors, Geologist, and Drillers on site 8:00am-4:30pm - Survey crew attempted to run elevation to breakwater rough water prevented them from finishing job - Geologist, Drillers, and ship crew began loading barge and securing equipment - Docking boat and barge at Ferry St. Bridge Dock
October 31 Saturday	- Surveyor, Geologist, and Drillers, on site at 7:00am-4:30pm - Surveyors and Geologist established control on Luddington Breakwater which will be used for positioning the barge over the drill holes. - Drillers and Ship crew finished loading the barge, drill rig was welded to the barge - Drilling equipment was loaded at Talmadge Brother Dock - Steamed into position on first boring, no drilling performed since it took approximately 2 hours to get positioned
November 1 Sunday	- Surveyors, Geologist, and Drillers on-site 7:00am-8:30pm - Positioned boat & barge for drilling - Drilled hole FD-A to a depth of 45 feet (MLW) - Returned to Ferry St. bridge dock

Date	Activity
November 2 Monday	- Surveyors, Geologist, and Drillers on site at 7:00am-8:00pm - Weather: morning was warm, calm (Easterly winds) , waves 1 ft. - afternoon was cool, rough water (Westerly winds), waves 2 - 3+ ft. - Started work on FD-G advanced boring to 34.3 ft when high winds and tide caused anchors on the barge to break loss, spuds would not hold barge. It was necessary to return to Ferry Street Bridge Dock - Survey crew provided water readings (MLW) and start to set control point on East Breakwater
November 3 Tuesday	- Surveyors, Geologist, and Drillers on-site at 6:45am-3pm - Weather Southerly winds with 2'-3' waves, temp. 50°F - Tried to reposition over FD-G, could not reposition due to rough water and strong winds. - Survey crew on-site to provide water reading (MLW) - Stayed onsite until 1:00 p.m. and then returned to dock. Waited until 3:00 p.m., winds did not calm.
November 4 Wednesday	- Surveyors, Geologist, and Drillers, on-site 7:00am-3:00pm - High winds caused rough water (3 - 4 ft. waves) therefore the crew did not attempt to drill for safety reasons. Forecast was for high winds through Thursday pm, therefore the decision was made to not attempt to work Thursday - Held Safety Meeting - Left for Canton office by commercial airline at 5:30pm
November 6 Friday	- Left Potsdam airport 5:00am by charter flight - Surveyors, Geologist, Drillers on site 8:00am-3:00pm - Weather at 8:00am, winds gusting up to 35 mph from the SW shifting to the NW in the afternoon, waves 3'(+), temp. 40°F - Discussed with the captain the possibility to work in PM. Waited until 3pm and decided today was to rough and windy to work on water. - Tomorrow weather forecast sounds favorable, winds from NW @ 15 mph. Scheduled to start for @ 6:00am - Moved motor boat from Ferry St. Bridge Dock to Light House Bait Shop so surveyors could start before the barge arrives on location.
November 7 Saturday	- Surveyors, Geologist, and Drillers onsite 6:00am-2:00pm - Weather (am): temp. 40°F, winds out of West @ 20+ mph, waves 2'-3' severe chop, small craft advisory. - Weather(pm): temp. 40°F, winds out of NW @ 20 mph - Waited throughout the day for the weather to improve, however there was little improvement therefore we did not steam into position

Date	Activity
November 8 Sunday	- Surveyors, Geologist, and Drillers onsite 6:30am-4:30pm - Weather (am) temp. 50°F, winds light SW, waves 1'-1.5' - Weather (pm) temp. 50°F, winds 15-20 mph, 2'-3' waves - Arrived at Lighthouse Marina, set out boring markers for FD-G, started drilling at 9:30 advanced hole to 32 ft when it was necessary to discontinue drilling in PM due to rough water, stayed on position until 4:30pm waiting for the waves to calm. The waves were causing the barge to move up and down about 1 ft. Therefore, it was extremely difficult to drive casing safely. Could not spin casing due to up and down movement.
November 9 Monday	- Surveyors, Geologist, & Drillers on-site 6:30am-3:30pm - Weather: temp. 40°F, winds SW-W, 20+ mph, waves 2 - 3 ft. - Arrived onsite (Lighthouse Marina) Surveyors tried to set markers however water was too rough for small boat, therefore they had to turn back - Boat and barge steamed into position however surveyors could not get on breakwater to position the barge. Barge was secured to boat in an attempt to stabilize the barge to prevent up and down movement. Did not substantially damper the vertical movement. Using this approach, the spuds could not be used and we had to use anchors to hold us in position. Even with 8 anchors out, the tide and current made it very difficult to stay on location. - Winds & waves same throughout day
November 10 Tuesday	- Surveyors, Geologist, and Drillers on-site 6:00am-2:30pm - Weather: temp. 30°F winds NW to NE at 15-20 mph, waves 2+ft. - Surveyors went to the Light House Marina, waters looked marginal; the decision was made to try drilling. The boat and barge steamed into position - Tried to set bouys, water extremely rough and Surveyors could not get on survey station at the breakwater - Boat and Barge returned back to Ferry Street Bridge - Called Canton Office and discussed with Spencer Thew, problem and progress, weather forecast, and past years records regarding wind volocity. Began to make attempt to obtain historical wind information. It appeared that we may have to take a new approach to drilling at this time of year - Spent afternoon looking for larger barge with heavier duty spuds or jack up barge. Canton Office assisted in this effort. A large spud barge ~100' x 30'x 7' with crane was located in Boston, however it was not available for 3 to 4 weeks. Could not locate a jack up barge that would be available this year.

Date	Activity
November 11 Wednesday	- Surveyors, Geologist, and Drillers onsite 6:30am-4:00pm - Weather: Winds out of NW At 25 mph and waves 2.5' to 3', temp. 30-50°F, small craft advisory in Long Island Sound - Tried to set bouys, however weather extremely bad, had to turn back, Boat and Barge came out to channel and got secured in general location of boring. When surveyors could not position barge, we turned back and returned to Ferry St. Dock - Spencer Thew in Canton Office made the decision to temporarily discontinue work until we could improve methodology. - Made arrangements for crane to unload drill rig - Drillers, and ship crew began unloading drill rig & equipment from barge
November 12 Thursday	- Surveyors, Geologist, and Drillers on-site 7:00am-1:00pm - Finished unloading barge, performed clean up - Started demobilizing barge
November 13 Friday	- Barge demobilized

TABLE IIA

CD024 - NEW HAVEN, CT

TELEPHONE LOG
FOR
SEISMIC SURVEY

Date	Conversation

July 29
Wednesday
	- J. Thew to Paul L'Heureux Corps of Engineers
	  - Discussed our procedures to record the Seismic Data and establish horizontal positioning of the boat equipped with Seismic equipment
	  - Paul requested that J. Thew visit the Corps to obtain information the Corps had on radio navigation equipment and review the Corps procedure
	- S. Thew visited the Corps office in Waltham, MA, in the afternoon

July 30 Thursday	- S. Thew called the Corps of Engineers to discuss the use of radio navigation equipment. ATL is trying to make arrangements to subcontract the horizintal positioning to a firm from the west coast - S. Thew then talked to Paul Fiske of Weston Geophysical who indicated they could use their radio navigation equipment. Arrangments were made to use Weston's equipment

July 31
Friday
	- S. Thew to Paul Fiske, Weston Geophysical regarding procedures for horizontal positioning of seismic survey by using radio navigation equipment.
	  - Weston Geophysical is scheduled to mobilize Tuesday August 4th
	- J. Thew contacted Petty Officer Hitchcock, U.S. Coast Guard 203/773-2464, regarding clearance into shipping channel
	- J. Thew tried to contact Larry Williams regarding boat for surveyors (203/878-9395)
	- J. Thew to Paul Fiske of Weston Geophysical to discuss the procedures involved in collection of Seismic Data
	  Reflection - Two Methods
	  1) Boomer Board - has transducer that produces a knocking sound
	  2) Sparker - sends down electric charge
	  Refraction -
	  Use a 40 cubic inch air gun set 5-7 feet below the water surface, air is discharged from the gun and the shock waves are transmitted to determine Seismic Data
	  - These Methods are all environmentally safe; they were designed with water life in mind
	- J. Thew to Petty Officer Hitchock of U.S. Coast Guard regarding clearance into the shipping channel, instructed to call Chief Kurowski Monday morning 8:00 am

Date	Conversation
August 3 Monday	J. Thew to Ed Rostowsky of Weston Geophysical - Jim Thew needed information for the U.S. Coast Guard regarding the boat being used for seismic work - Needed to know where Weston Geophysical would dock the boat - Ed Rostosky told J. Thew to call back in the afternoon and he would have the information - Chief Kurowski of U.S. Coast Guard needs information on boat being used; would like to know dates & times - Informed him ATL would be starting the project on August 5th (Wednesday) - Ed Rostosky saw no problem with starting on Wednesday August 5th - J. Thew to Ed Rostosky Boat Description: 31' White Fiberglass Lobster Boat "Phantom" 905254 Weston will set trisponders at two locations for the entire job 1) West Breakwater 2) Sewage Disposal 3) STA #16 to calibrate trisponder - ATL will take care of tide information: Need times of high and low tide Record times of every seismic shot
August 4 Tuesday	- J. Thew to Ed Rostosky, Weston Geophysical - Ed was checking out navigation equipment - J. Thew informed Ed Rostosky of location of a slip for their boat at Oyster Point Marina - Weston had a problem with the navigation equipment, would call J. Thew by 5:30 pm to inform if they would be mobilizing Wednesday or if they had to send equipment for repair - J. Thew to Paul L'Heureux to inform Paul of our progress; J. Thew left message since Paul was not in his office. - Ed Rostosky, Weston Geophysical to J. Thew is going to rent navigation equipment since they were having difficulties with their equipment.

Date	Conversation
August 5 Wednesday	- J. Thew (ATL) to U.S.G.S. gave information of Benchmark #22 at corner of Howard Street and Fifth Street - J. Thew to U.S.C.E. Office told them of our progress on the job. Left message since Paul L'Heureux was not in the office. - Dave Strack Telecon w/U.S.G.S. in Missouri They told him to call National Geodetic Survey at 301/443-8631 - David Strack telecon with National Geodetic Survey They told him to call the Connecticut Department of Natural Resources at 203/566-3540 (Sid Quarrier) - Dave Strack telecon with Connecticut Department of Natural Resources They told Dave to contact Connecticut Department of Transportation - David Strack telecon with Connecticut National Resources Center - They told him to contact Connecticut Dept. of Transportation, the Mapping & Survey Department at 203/566-4638 - They have the elevation and will send TM64, TM65 and TM66, we will need TM65 - Will mail copies to ATL in Canton and to our motel - Also, sending conversion chart of Mean Sea level to Mean Low Water
August 6 Thursday	- J. Thew (ATL) to Ed Rostosky (Weston Geophysical) - Ed informed J. Thew of the status of the navigation equipment and that Weston would not be prepared to begin until Saturday, August 9. - S. Thew (ATL) to J. Thew (ATL), asked J. Thew to call Weston and the Corps and delay the start until Monday morning, August 10. - J. Thew to Ed Rostosky, Weston Geophysical asked him if he would delay start until Monday, August 10, he thought it would be a good idea - J. Thew to Paul L'Heureux, Corps of Engineers told him about navigation equipment problems and delaying the start until August 10. - J. Thew to Oyster Point Marina; checked to be sure we would have a slip for boat on Sunday, August 9.
August 10 Monday	- J. Thew (ATL) to Corps of Engineers (Paul L'Heureux); called to report status of job - Paul not in his office
August 11 Tuesday	- J. Thew (ATL) to Corps of Engineers (Paul L'Heureux) informed him that we were working; he told me to contact Yuri Yatsevitch from now on until completion of project
August 12 Wednesday	- J. Thew (ATL) to Corps of Engineers (Yuri Yatsevitch) - Left message regarding progress, Yuri was not in the office. - J. Thew to Shirley at ATL. - We called in our data and Shirley fed it into the computer and gave us coordinates for Beacon and location of seismic points - Talked with Spencer on progress of job

Date	Conversation
August 13	- J. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - Reported progress to date and problems we had encountered. - Yuri told me to make sure problems were documented
August 14 Friday	- J. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - Yuri was not in the office, left message that we called to report progress.
August 15 Saturday	- No calls were made
August 16 Sunday	- No calls were made
August 17 Monday	- J. Thew (ATL) to Ron DeFilippo (Corps of Engineers) - Informed him that the refraction work would be done Tuesday August 18 and Reflection should be done by Friday August 21st - He wanted to know when the drilling would start - The contract reads after the Corps has reviewed seismic data, the drilling would then start
August 18 Tuesday	- J. Thew (ATL) to Corps of Engineers - Ron DeFilippo and Yuri Yatsevitch were not in the office - Left a message that refraction was done and the reflection gear was being put on board and the job should be done Friday, maybe Saturday.
August 19 Wednesday	- No calls were made
August 20 Thursday	- No calls were made
August 21 Friday	- J. Thew (ATL) to Corps of Engineers - Tried to reach Ron DeFilippo, was not in the office - Left message that the job was nearly complete - Told them I would call in Monday August 24, 1987
August 22 Saturday	- No calls were made

TABLE IIB

CD024 - NEW HAVEN, CT

TELEPHONE LOG FOR SUBSURFACE EXPLORATION

Date	Conversation
October 30 Friday	- G. Hargrave (ATL) to Corps of Engineers - Received the following information from Steve Johnson, Surveying Manager - Corps phone (617) 647-8527 - Elevation Sta #199 4.388' mean sea level - Convert to mean low water - add 2.4' - Conversion of 2.4' is given by NOAA and differs from previous figures from Conn. DOT by 0.2' - Conn. DOT 2.2' - We will use 6.8' for Elevation of Sta #199 - BM #4 on U.S.G.S. Map means aproximately 4' above mean sea level - If Steve is not in and information is needed, contact Maureen Murray - same number
October 31 Saturday	No calls made
November 1 Sunday	No calls made
November 2 Monday	- S. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - Reported progress to date, completed Boring FD-A on Sunday
November 3 Tuesday	- G. Hargrave (ATL) to S. Thew (ATL) - After several attempts to position the drill rig, which was prevented due to high winds and waves, G. Hargrave informed S. Thew of the problem. S. Thew requested a three day weather forcast and normal conditions for November in New Haven Harbour. - G. Hargrave called the National Weather Service (1-203-936-1212) and received the following information: 11/3 Tuesday, 1'-3' swells, 10-15 mph winds, possible rain 11/4 Wednesday 3'-5' swells, 25-30 mph winds 11/5 Thursday change to NW winds 10mph - Called Bridgeport Flight Service for one day forecast 1-800-992-7433 - Called Weather Surveys - a consultant 1-203-936-1212, could not obtain information since we would have to arrange a contract with them.
November 4 Wednesday	- S. Thew (ATL to Yuri Yatsevitch (Corps of Engineers) - Reported that we were not able to work on Tuesday or Wednesday due to severe waves. - Reported that on Monday we had began Boring FD-G, however, were blown off it due to high winds and rising tides.

Date	Conversation
	- G. Hargrave (ATL) to S. Thew (ATL) 4:30 p.m. - Discussed the problem of high waves; surveyors could not access the control station on the breakwater. - The rough water made driving of casing unsafe on the barge. - Made decision to not work Thursday due to unfavorable weather forecast.
November 5 Thursday	- S. Thew (ATL) to Corps of Engineers - Left message that we had discontinued work for 1 day due to high winds and rough water
November 6 Friday	- G. Hargrave (ATL) to S. Thew (ATL) - Reported weather conditions and reported that we would try to work Saturday and Sunday - S. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - Notified Yuri that we had remobilized to the job site on Friday, November 6, 1987, however, were again not able to work due to the high waves which generally exceeded 3 ft. I indicated to Yuri that we would attempt to work through the weekend.
November 7 Saturday	- G. Hargrave (ATL) to S. Thew (ATL) - Could not work due to adverse weather conditions.
November 8 Sunday	- No calls made
November 9 Monday	- S. Thew (ATL) to Ron DeFillipo (Corps of Engineers) - Reported that progress was minimal over the weekend. - Indicated that we had attempted to work both Saturday and Sunday, however, could not due to the high southwest winds which were usually in excess of 20 mph creating waves in excess of 3 ft. Ron indicated that he would pass the information on to Yuri who was out of the office on this particular day.
November 10 Tuesday	- G. Hargrave(ATL) talked to Wally Schicterdecker of Essex Island Marina he has a barge but it is tied up until January, he gave me Ned Libby's name and address. Connecticut River Dock & Dredge P.O. Box 744 Essex, CT 06426 (203) 526-9656 - Talked to Ned Libby's wife Carol Libby and she is going to contact her husband tonight; he will contact us tonight at the motel - Talked to Jeff Shapiro at Cedar Island Marina he does not have barge told us to check with Clinton Yacht Haven, we checked there but no one was there - Called Jim Jenkins from J. W. Jenklin's Inc. (no answer) - Called Norwalk Marina (no answer)

Date	Conversation
	- ATL Canton Office contacted several Marine contractors, from Boston to N.Y.C. in an attempt to get a larger barge or a jack up barge. No jack up barge could be located and all large barges were committed for at least 1 month. Canton Office located a 100' x 30' x 7', Spud Barge at F. A. Francou, Inc. in Salisbury, Mass. However, earliest available date was late December. - S. Thew (ATL) to Chief Petty Officer Lewis at 10:20 a.m. - Notified him that we would be working in New Haven Harbor through November 24, 1987, during the hours of 6:00 a.m. to 7:00 p.m. - S. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - 2:00 p.m. - Yuri was not in. - Yuri Yatsevitch (Corps of Engineers) to S. Thew (ATL) - 2:55 p.m. - S. Thew told Yuri that we had 20+ mph NW winds with 3 ft waves and could not work. Today the area was calmer outside the breakwater with the NW winds than it had been with the SW winds. We are presently looking for a large barge or a jack up barge. Spence is to meet with our Marine Contractor on Wednesday morning to review other alternatives.
November 11 Wednesday	- S. Thew (ATL) to Marine Contractor - Marine Contractor recommended larger barge with a crane to lift spuds - G. Hargrave(ATL) talked to S. Thew (ATL) via phone, S. Thew said we must discontinue work until we can improve methodology or the weather improves. The option appears to be a very large barge with heavy duty spuds or a jack up barge
November 12 Thursday	- S. Thew (ATL) to Yuri Yatsevitch (Corps of Engineers) - told him we had made the decision to temporily discontinue since we could not stabilize barge and survey crew was working under conditions that were marginal and approaching dangerous from the safety aspect. We cannot access the break water when there are small craft advisories.
November 13 Friday	- G. Hargrave called Bridgeport Airport for weather information, (1-800-992-7433) They said that they keep a hard copy for two weeks, if we want a copy we have to go there to pick it up.

Section 6

CHAIN OF CUSTODY LOG

ATLANTIC TESTING LABORATORIES, Limited

CHAIN OF CUSTODY LOG

PROJECT: New Haven Harbor Improvements
ATL Job No CD024

ITEMS:

Tubes _____

Bottles _____

Jar Samples 13

Core Boxes _____

Sampling Logs 2

Date & Time Received	Date & Time Transferred	Comments	Custodian
November 1987	1/18/88 9:45 AM	AS SAMPLED	Lucy Hargrave
1/18/88 9:45AM	1/20/88 2:25	—	Jeff King
1/20/88 2:25	1/21/88 7:50 A.M.	—	Cliff Jones
1/21/88	1/21/88 10:40AM	—	Michael Carroll

Section 7

SAFETY REPORTS

WEEKLY SAFETY MEETING

NEDSO

Date held Oct. 29, 1987

THRU: Area Engineer, NED Area

Time AM

TO: Safety Office, NED

Report No. _____

1. Weekly safety meeting was held this date for the following personnel:

Contract No. /D.O.No. 0022 Contractor Atlantic Testing Laboratories, Ltd.

Conducted By Greg Hargrave All personnel present (Contr) 5
(Sub) -0-
(Govt) -0-

Subjects discussed (Note, delete, or add):
EM 385-1-1, Section: _____

Accident Prevention Plan

✓ Individual Protective Equipment - Hard hat, steel toed shoes

✓ Prevention of Falls - watch slippery surfaces

✓ Back Injury, Safe Lifting Techniques - use legs, not back

Fire Prevention -

✓ Sanitation, First Aid, Waste Disposal - keep work area neat

✓ Tripping Hazards - trash, hose, nails in lumber - "

Staging, Ladders, Concrete Forms, Safety Nets -

✓ Hand Tools, Portable Power Tools, Woodworking Machinery - use proper tools

✓ Equipment Inspection & Maintenance (Zero Defects) -

✓ Hoisting Equipment -

✓ Ropes, Hooks, Chains and Slings - Zero Defects

Electrical Grounding, Temporary Wiring, GFCI -

✓ Lockouts for safe clearance procedures - electrical, pressure, moving parts -

✓ Welding, Cutting - wear eye protection

Excavations -

Loose Rock and Steep Slopes -

Explosives -

✓ Water Safety - wear life jackets, 2 men/boat

Toxic materials - hazards, MSDS, respiratory, ventilation -

Other -

Prepared by Greg Hargrave Title Geologist

2. Forwarded.

Signature Greg R. Hargrave
Resident Engineer

CF: EXPOSURE HOURS:
Work Date: 10/28, 10/29, —
Non-work Date: _____

Man Hours:
Contr: _____
Subcontr: _____
Govt: _____
TOTAL: _____

NED APP FL 62 251

WEEKLY SAFETY MEETING

NEDSO

Date held November 4, 1987

THRU: Area Engineer, NED Area

Time PM

TO: Safety Office, NED

Report No. D O 0022

1. Weekly safety meeting was held this date for the following personnel:

Contract No. /D.O.No. _____ Contractor Atlantic Testing Laboratories, Ltd.

Conducted By G. Hargrave

All personnel present (Contr) 5
(Sub) -0-
(Govt) -0-

Subjects discussed (Note, delete, or add):
EM 385-1-1, Section: _____

Accident Prevention Plan

✓Individual Protective Equipment - hard hat, gloves

✓Prevention of Falls - watch slippery surfaces

Back Injury, Safe Lifting Techniques - use legs

Fire Prevention -

Sanitation, First Aid, Waste Disposal -

✓Tripping Hazards - trash, hose, nails in lumber - keep work area neat

Staging, Ladders, Concrete Forms, Safety Nets -

Hand Tools, Portable Power Tools, Woodworking Machinery -

✓Equipment Inspection & Maintenance (Zero Defects) -

✓Hoisting Equipment -

✓Ropes, Hooks, Chains and Slings - zero defects

Electrical Grounding, Temporary Wiring, GFCI -

Lockouts for safe clearance procedures - electrical, pressure, moving parts -

✓Welding, Cutting - wear proper safety equipment, goggles, gloves leather shoes

Excavations -

Loose Rock and Steep Slopes -

Explosives -

✓Water Safety - 2 men in small boat, both wear life jackets

Toxic materials - hazards, MSDS, respiratory, ventilation -

Other -

Prepared by G. Hargrave Title Geologist

2. Forwarded.

Signature _____
Resident Engineer

CF: EXPOSURE HOURS:
Work Date: 10/23, 10/24, 10/30, 10/31, 11/1, 11/2, 11/3, 11/4, 11/6, 11/7, 11/8, 11/9
Non-work Date: 11/5

Man Hours:
Contr: 77.75
Subcontr: 77.75
Govt: 0
TOTAL: 155.5 hours

NED APP FL 251

WEEKLY SAFETY MEETING

NEDSO

Date held November 9, 1987

THRU: Area Engineer, NED Area

Time PM

TO: Safety Office, NED

Report No. D.O. 0022

1. Weekly safety meeting was held this date for the following personnel:

Contract No. /D.O.No. _____ Contractor Atlantic Testing Laboratories, Ltd.

Conducted By Greg Hargrave

All personnel present (Contr) 5
(Sub) -0-
(Govt) -0-

Subjects discussed (Note, delete, or add):
EM 385-1-1, Section: _____

Accident Prevention Plan

✓ Individual Protective Equipment - gloves, safety shoes, hard hats

✓ Prevention of Falls - use hand railings, watch slippery surfaces

✓ Back Injury, Safe Lifting Techniques - use legs, better yet, use proper equipment

Fire Prevention -

✓ Sanitation, First Aid, Waste Disposal - keep work area neat

✓ Tripping Hazards - trash, hose, nails in lumber - "

Staging, Ladders, Concrete Forms, Safety Nets -

✓ Hand Tools, Portable Power Tools, Woodworking Machinery - use proper tools, wrenches etc.

✓ Equipment Inspection & Maintenance (Zero Defects) -

✓ Hoisting Equipment -

✓ Ropes, Hooks, Chains and Slings - zero defects

Electrical Grounding, Temporary Wiring, GFCI -

✓ Lockouts for safe clearance procedures - electrical, pressure, moving parts - watch hands

✓ Welding, Cutting - wear proper safety equipment to protect eyes + hands around moving parts

Excavations -

Loose Rock and Steep Slopes -

Explosives -

✓ Water Safety - 2 men to boat, both are to wear life jackets

Toxic materials - hazards, MSDS, respiratory, ventilation -

Other -

Prepared by Greg Hargrave Title Geologist

2. Forwarded.

Signature Gregory P. Hargrave
Resident Engineer

CF: EXPOSURE HOURS:
Work Date: 10/10, 11, 11/12
Non-work Date: _____

Man Hours:
Contr: 58
Subcontr: 58
Govt: -0-
TOTAL: 116

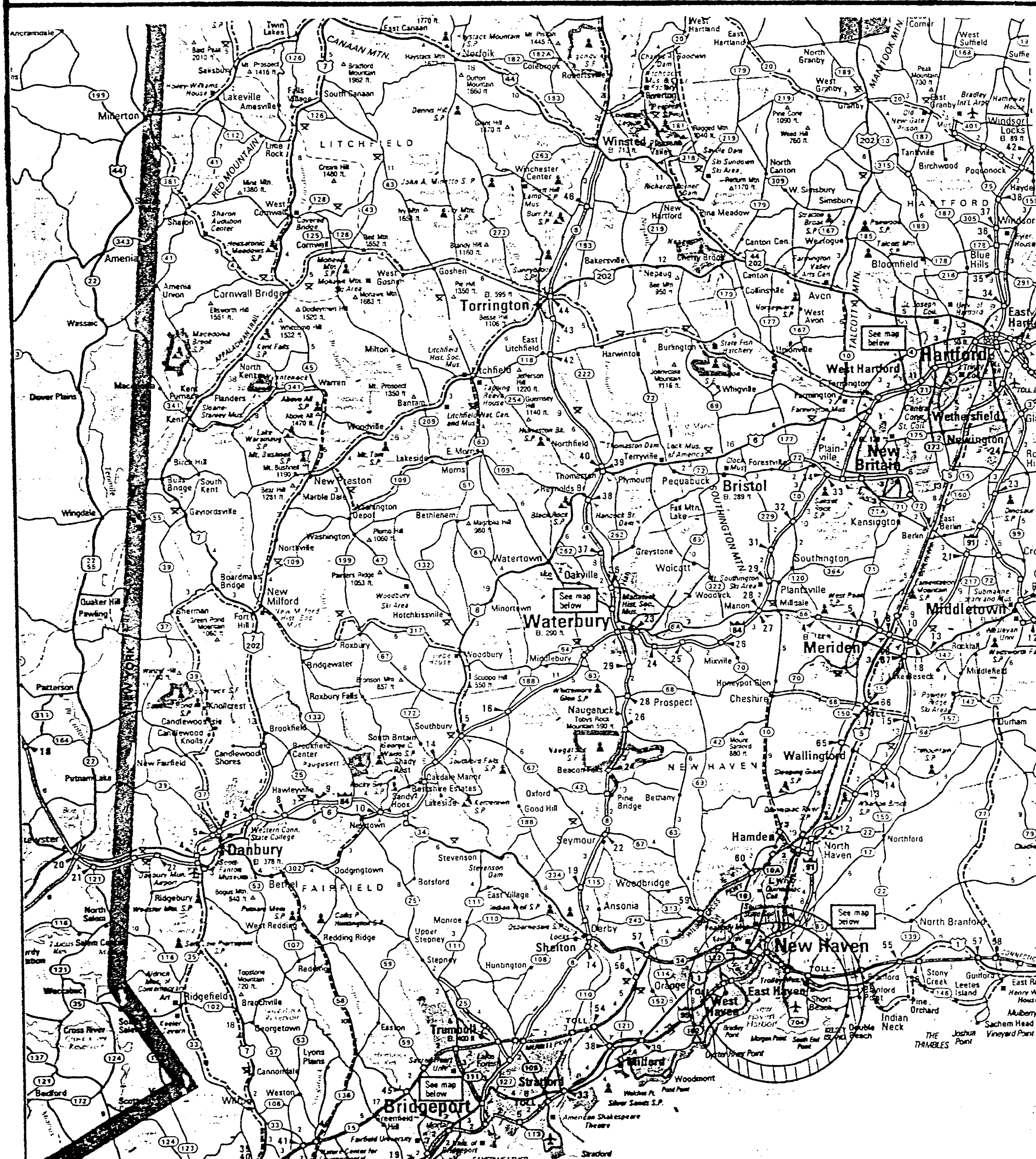
NED APP FL 251

Section 8

FIELD INSPECTOR'S LOGS

a. Figure 1 - General Project Map

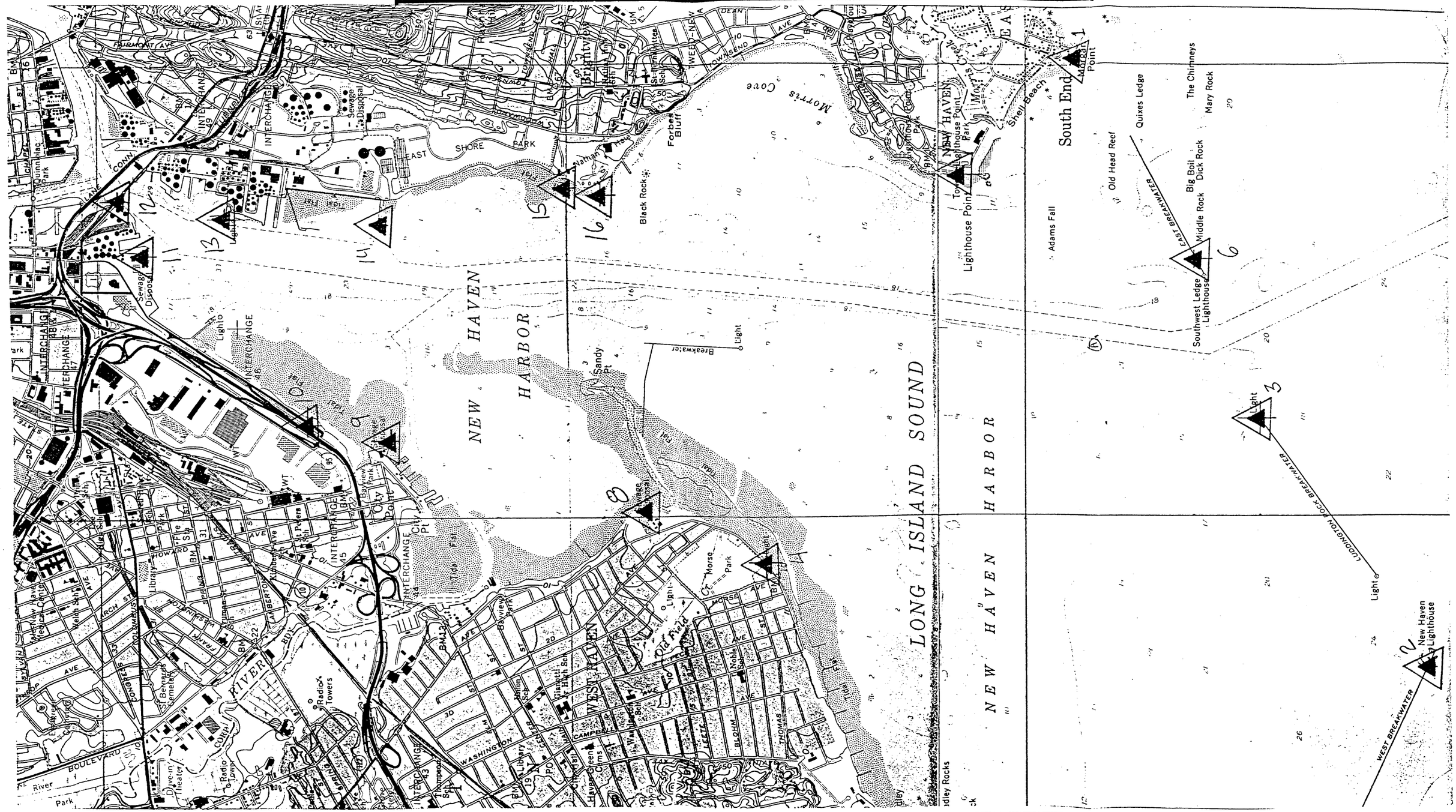
GENERAL PROJECT MAP



PROJECT No CD024	SCALE: NONE	New Haven, Connecticut

b. Figure 2 - Site Location Map

SITE LOCATION MAP



PROJECT No.	SCALE:	U.S.G.S. QUADRANT:
CD024	1:24000	New Haven and Woodmont, Connecticut

c. Figure 3 - Boring Location Plan

d. Boring Logs

CORPS OF ENGINEERS, U. S. ARMY
NEW ENGLAND DIVISION
FOUNDATION AND MATERIALS BRANCH

FIELD LOG OF TEST BORING

PROJECT NO. D.O. 0022

Site New Haven Conn — Page 1 of ___ Pages

Hole No. FD87-2 Diam. (Casing) ___ — Boring Started 11/2/87

Co-ordinates: N 146761 E 554215 — Boring Completed 11/2/87

Drilled by Cambridge + Gordon — Report Submitted ___

Purpose of Exploration Determine dredging conditions for a channel deepening to 41' MLW and widening from 400 ft to 500 ft in places

Elevation Top of Hole 24.8' below ~~M.S.L.~~ MLW — Casing Left in Place -0-

Total Overburden Drilled 9.5 Feet

Elevation Top of Rock NA M.S.L.

Elevation Bottom of Hole 34.3 below MLW M.S.L.

Total Rock Drilled 0 Feet

Total Depth of Hole 9.5 Feet

Core Recovered — %

Core Recovered — Ft.; — Diam. — In.

Soil Samples 2 In. Diam. 6 No.

Soil Samples ___ In. Diam. ___ No. — Water Table Depth ___

Depth From	Depth To	Method of Drilling and Type of Bit Used
24.8	34.3	Continuous split spoon sampling advanced with 140 lbs hammer
24.8	32.3	HX casing advanced with 300 lbs hammer

INDEX

Prepared by Greg Hargrave — Field Data — Lab. Data

Submitted by Atlantic Testing Laboratories Limited ___

MED FORM DEC 63 121 — REPLACES EDITION OF JUN 51 WHICH MAY BE USED UNTIL EXHAUSTED

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site New Haven Conn — Page 2 of 3 Pages

Boring No. FD 87-2 Desig. ____ Diam. (Casing) ____

Co-ordinates: N 146761 E 554215

Elevation Top of Boring 24.8' below MLW ~~M.S.L.~~ — Hammer Wt. 140 lbs — Boring Started 11-2-87

Total Overburden Drilled 9.5 Feet — Hammer Drop 30" — Boring Completed 11-2-87

Elevation Top of Rock NA M.S.L. — Casing Left 0' — Subsurface Water Data NA Page —

Total Rock Drilled 0 Feet — Obs. Well NA

Elevation Bottom of Boring 34.3 below MLW ~~M.S.L.~~ — Drilled By Cambridge & Gordon

Total Depth of Boring 9.5 Feet — Mfg. Des. Drill CME 45

Core Recovered 0 % No. Boxes 0 — Inspected By: Greg Hargrave

Core Recovered 0 Ft : — Diam. — In. — Classification By: Al Brown

Soil Samples 2 In. Diam. 6 No. — Classification By: Greg Hargrave

Soil Samples ____ In. Diam. ____ No.

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	6" SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
							24.8' of water
20'							
22'							
24'							
24.8'		S1			W O M 3	Sampled with split spoon sampler Advanced HX casing to 28.3' using 300 lbs hammer	
26'					4 3	Advanced roller bit to 28.3	Grey m f SAND, trace SILT; trace organics, trace shells SW
		S-2			2 1	Note: easy drilling	
28'							

GENERAL REMARKS:

Scale - 0'-20'; 1" = 40'
20'- ; 1" = 2'

FORM 1258 (Test)

Boring No. FD 87-2

Site: New Haven Conn

Boring No: FD-87-2

DEPTH	CORE/SAMPLE NO.	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER 6" ON CORE RECVY	6" SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
28.3						
				2	Sampled	Similar Soil
				4		
	S-3			4		
30' 30.3'				5		
				4	Sampled	
				7	Advanced HX casing to 32.3'	Grey cmf SAND;
	S-4			8	Advanced roller bit to 32.3'	trace GRAVEL, trace SILT; trace organics, trace shells, SW
32' 32.3'				13		
				12	Sampled	Similar Soil
	S-5A			20		
				61		Brown cmf SAND; little GRAVEL, trace SILT SW
34' 34.3'	S-5B			24	Exploration Terminated 11/2/87	
36'						
38'						
40'						
42						
44'						
45'						

CORPS OF ENGINEERS, U. S. ARMY
NEW ENGLAND DIVISION
FOUNDATION AND MATERIALS BRANCH

FIELD LOG OF TEST BORING

PROJECT NO. C.O. 0022

Site New Haven Conn — Page 1 of 3 Pages

Hole No. ED87-1 Diam. (Casing) ____ — Boring Started November 1, 1987

Co-ordinates: N 148456 E 553919 — Boring Completed November 1, 1987

Drilled by Cambridge + Garden — Report Submitted ____

Purpose of Exploration Determine Dredging Conditions for channel deepening to 42' MLW and Widening from 400 ft to 500 ft

Elevation Top of Hole 30.8 below MLW M.S.L. — Casing Left in Place 0' Fee

Total Overburden Drilled 14.2 Feet

Elevation Top of Rock NA M.S.L.

Elevation Bottom of Hole 45 below MLW M.S.L.

Total Rock Drilled 0 Feet

Total Depth of Hole 14.2 Feet

Core Recovered — %

Core Recovered — Ft.; — Diam. — In.

Soil Samples 2 In. Diam. 7 No.

Soil Samples ____ In. Diam. ____ No. — Water Table Depth NA

Depth From	Depth To	Method of Drilling and Type of Bit Used
30.8	41	HX casing advanced with 300 lbs hammer
30.8	45	Continuous split spoon sampling (spoon advanced with 140 lbs hammer)

INDEX

Prepared by Gina Hargraves — Field Data — Lab. Data

Submitted by Atlantic Testing Lab

NED FORM DEC 63 121 — REPLACES EDITION OF JUN 51 WHICH MAY BE USED UNTIL EXHAUSTED

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site New Haven Conn — Page 2 of 3 Pages

Boring No. FD-87-1 Desig. ____ Diam. (Casing) ____

Co-ordinates: N 148456 E 553919

Elevation Top of Boring 30.8' below MLW M.S.L.
Total Overburden Drilled 14.2' Feet
Elevation Top of Rock NA M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring 45' below MLW M.S.L.
Total Depth of Boring 14.2 Feet
Core Recovered — % No. Boxes —
Core Recovered — Ft : — Diam. — In.
Soil Samples 2 In. Diam. 7 No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. 140 Boring Started 11-1-87
Hammer Drop 30" Boring Completed 11-1-87
Casing Left 0'
Subsurface Water Data NA Page ____
Obs. Well NA
Drilled By Cambridge + Gordon
Mfg. Des. Drill CME 45
Inspected By: Greg Hargrave
Classification By: Al Brown
Classification By: Greg Hargrave

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. CORE RECOVERY	6" SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0'						
10'						
20'						
30'						
30.8'	S-1			W O R 1 1 2 5	Sampled using 1 3/8" I.D. split spoon from 30.8 to 33.5 Advanced HX casing to 33.5 using a 300 lbs hammer cleaned casing to 33.5 using wet rotary drill	Grey m f SAND; trace SILT; trace organic material, trace shell fragments. SW
34'	S-2			20 10 2 1	Sampled from 33.5' to 35.5'	Similar Soil
36'	S-3			5 1 2	Sampled from 35.5' to 37.5 advanced and cleaned casing to 37.5'	Similar Soil

GENERAL REMARKS:
Scale - 1'-30'; 1" = 10'
30'-45'; 1" = 2"

Site	Boring No.	Page 3 of 3
New Haven, Conn	FD87-1	

DEPTH		CORE/SAMPLE			BLOWS PER 6" / CORE REC'VY	6" SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	1'=	NO.	SIZE	DEPTH RANGE			
37.5					1		
38		S-4			4 3 5	Sampled	Similar Soil
39							
40		S-5			9 6 9 10	Sampled Advanced casing to 41' Wet rotary drilling to 41'	Similar Soil, little shells
41							
42		S-6			8 4 7 6	Sampled	Similar Soil; trace fine GRAVEL
43							
44		S-7			4 4 3 3	Sampled Boring Terminated 11/1/87 @ 45' below MLW	
45							

Section 9

OTHER REPORTS TAKEN

a. Weather Data
b. Survey Data
c. Tidal Elevations

a. Weather data

METEOROLOGICAL DATA FOR 1986

BRIDGEPORT, CONNECTICUT

LATITUDE: 41°10' N LONGITUDE: 73°08' W ELEVATION: FT. GRND 7 BARO 28 TIME ZONE: EASTERN WBAN: 94702

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	38.0	34.8	49.2	58.7	70.5	76.6	80.7	78.1	72.4	63.1	50.7	41.9	59.6
-Daily Minimum	23.1	23.5	30.5	42.4	51.7	57.0	65.5	63.2	57.0	45.4	33.8	29.1	43.5
-Monthly	30.6	29.2	39.9	50.6	61.1	66.8	73.1	70.7	64.7	54.3	42.3	35.5	51.6
-Monthly Dewpt.													
Extremes													
-Highest	54	49	73	72	88	89	94	86	82	83	65	58	94
-Date	18	2	31	30	31	23	7	9	30	1	9	3	JUL 7
-Lowest	4	13	11	33	36	44	52	46	45	33	20	15	4
-Date	15	26	8	13	4	3	4	30	17	31	14	14	JAN 15
DEGREE DAYS BASE 65 °F:													
Heating	1060	997	772	425	174	41	3	23	68	345	673	908	5489
Cooling	0	0	0	0	60	103	263	204	66	18	0	0	714
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)													
Sunrise - Sunset	6.1	7.1	5.2	6.4	5.5	5.8	7.0	6.7	7.1	5.6	7.3	6.6	6.4
Midnight - Midnight													
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	6	6	12	7	9	6	6	7	5	11	6	7	88
-Partly Cloudy	9	4	9	8	14	14	9	7	8	9	7	9	107
-Cloudy	16	18	10	15	8	10	16	17	17	11	17	15	170
Precipitation .01 inches or more	8	13	9	12	9	14	9	13	10	8	11	12	128
Snow, Ice pellets 1.0 inches or more	1	4	0	0	0	0	0	0	0	0	1	1	7
Thunderstorms	0	0	0	0	1	4	2	4	1	0	1	0	13
Heavy Fog, visibility 1/4 mile or less	4	1	2	2	4	3	1	0	1	0	1	2	21
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	0	3	0	0	0	0	0	3
32° and below	9	8	2	0	0	0	0	0	0	0	0	1	20
-Minimum													
32° and below	26	25	15	0	0	0	0	0	0	0	12	24	102
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)													
RELATIVE HUMIDITY (%)													
Hour 01													
Hour 07 (Local Time)	68	73	71	69	75	79	86	85	84	81	80	75	77
Hour 13	53	61	49	54	59	60	67	66	62	56	62	62	59
Hour 19	62	66	56	63	65	69	77	75	74	68	68	67	68
PRECIPITATION (inches):													
Water Equivalent													
-Total	2.66	3.05	2.32	1.65	0.41	3.16	5.74	2.43	0.85	2.14	4.91	4.41	33.73
-Greatest (24 hrs)	0.85	0.74	1.23	0.47	0.15	1.06	2.49	0.70	0.39	1.06	1.27	1.54	2.49
-Date	26-27	17-18	14-15	21	20-21	6- 7	26-27	10-11	20-21	3- 4	18-19	18-19	JUL 26-27
Snow, Ice pellets													
-Total	2.0	11.0	T	T	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.3	18.1
-Greatest (24 hrs)	2.0	4.5	T	T	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.4	4.5
-Date	27-28	7- 8	12	11							18-19	11	FEB 7- 8
WIND:													
Resultant													
-Direction (!!!)													
-Speed (mph)													
Average Speed (mph)													
Fastest Obs. 1 Min.													
-Direction (!!!)	26	33	22	07	29	08	22	08	33	30	23	09	22
-Speed (mph)	35	28	35	33	24	32	30	28	28	25	30	30	35
-Date	6	25	19	16	2	12	26	18	16	6	26	2	MAR 19
Peak Gust													
-Direction (!!!)	W	NW	W	E	NW		SW	NW	NW	NW	SW		
-Speed (mph)	46	37	47	44	36	41	41	40	40	41	40	45	47
-Date	6	25	11	16	4	29	26	24	16	6	26	25	MAR 11

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1985

BRIDGEPORT, CONNECTICUT

LATITUDE: 41°10' N LONGITUDE: 73°08' W ELEVATION: FT. GRND 7 BARO 00028 TIME ZONE: EASTERN WBAN: 94702

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	33.5	39.4	50.5	58.9	70.0	74.0	81.6	80.2	75.0	64.5	53.2	38.1	59.9
-Daily Minimum	18.9	25.1	33.0	42.7	51.8	57.2	65.6	65.3	58.2	47.5	40.0	24.7	44.2
-Monthly	26.2	32.3	41.8	50.8	60.9	65.6	73.6	72.8	66.6	56.0	46.6	31.4	52.1
-Monthly Dewpt.													
Extremes													
-Highest	52	62	74	80	84	85	87	92	90	77	67	54	92
-Date	2	25	28	26	11	10	30	15	4	10	20	2	AUG 15
-Lowest	-2	6	18	29	36	50	57	58	46	33	29	14	-2
-Date	21	4	19	10	4	7	24	31	14	30	16	26	JAN 21
DEGREE DAYS BASE 65 °F:													
Heating	1197	908	713	423	138	43	0	2	54	278	541	1032	5329
Cooling	0	0	0	3	19	71	276	251	110	8	0	0	738
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)	6.4	6.2	5.7	6.3	6.7	6.6	5.7	6.4	5.4	5.6	7.7	6.0	6.2
Sunrise - Sunset													
Midnight - Midnight													
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	7	6	10	5	4	5	8	8	12	13	5	8	91
-Partly Cloudy	9	10	9	13	13	12	14	9	7	4	5	10	115
-Cloudy	15	12	12	12	14	13	9	14	11	14	20	13	159
Precipitation .01 inches or more	12	5	11	11	10	12	9	9	6	7	14	13	119
Snow, Ice pellets 1.0 inches or more	3	2	0	0	0	0	0	0	0	0	1	2	.8
Thunderstorms	0	0	0	2	2	4	4	1	1	1	0	0	15
Heavy Fog, visibility 1/4 mile or less	2	1	1	3	2	2	1	1	2	2	1	0	18
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	0	0	2	1	0	0	0	3
32° and below	11	7	0	0	0	0	0	0	0	0	0	7	25
-Minimum													
32° and below	29	21	16	3	0	0	0	0	0	0	5	27	101
0° and below	1	0	0	0	0	0	0	0	0	0	0	0	1
AVG. STATION PRESS. (mb)													
RELATIVE HUMIDITY (%)													
Hour 01	71	78	64	73	82	81	79	78	80	79	80	71	76
Hour 07 (Local Time)	61	62	49	55	61	63	61	59	58	53	67	54	59
Hour 13	60	67	55	64	70	71	68	68	70	64	77	58	66
Hour 19													
PRECIPITATION (inches):													
Water Equivalent													
-Total	1.25	1.72	1.93	0.69	5.11	5.34	5.19	4.62	1.60	1.48	5.67	1.25	35.85
-Greatest (24 hrs)	0.37	0.93	0.93	0.40	1.52	1.24	1.63	2.43	0.62	0.58	1.66	0.54	2.43
-Date	4- 5	12	11-12	PM- 1	2- 3	15-16	26-27	30-31	27	5	16-17	11-12	AUG 30-31
Snow, Ice pellets													
-Total	11.2	6.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.5	22.7
-Greatest (24 hrs)	5.2	3.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.1	5.2
-Date	17	2	4								26	23	JAN 17
WIND:													
Resultant													
-Direction (!!!)													
-Speed (mph)													
Average Speed (mph)													
Fastest Obs. 1 Min.													
-Direction (!!!)	32	08	34	27	01	07	23	25	18	25	07	25	18
-Speed (mph)	29	38	32	32	29	32	29	23	74	26	35	30	74
-Date	26	12	6	6	3	5	26	8	27	27	5	27	SEP 27
Peak Gust													
-Direction (!!!)		E	W	W	NW	NW	SW	NE	NW	N	E	W	
-Speed (mph)	47	49	51	44	49	48	38	29	31	37	45	49	51
-Date	20	12	12	6	18	24	26	31	28	28	5	27	MAR 12

(!!!) See Reference Notes on Page 68

METEOROLOGICAL DATA FOR 1984

BRIDGEPORT, CONNECTICUT

LATITUDE: 41°10' N LONGITUDE: 73°08' W ELEVATION: FT. (grd) 7 (msl) 17 TIME ZONE: EASTERN WBAN: 94702

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	33.3	43.1	40.8	55.8	65.9	80.4	81.4	82.6	72.3	65.2	53.4	47.1	60.1
-Daily Minimum	19.8	29.9	27.4	40.0	49.6	61.6	64.7	67.0	54.2	50.2	36.6	33.3	44.5
-Monthly	26.6	36.5	34.1	47.9	57.8	71.0	73.1	74.8	63.3	57.7	45.0	40.2	52.3
-Monthly Dewpt.													
Extremes													
-Highest	46	57	51	70	78	93	93	90	81	72	66	61	93
-Date	26	24	26	30	26	11	14	15	25	20	5	30	JUL 14
-Lowest	-7	11	8	31	40	48	57	55	43	33	22	22	-7
-Date	22	2	10	22	17	1	26	21	28	6	20	8	JAN 22
DEGREE DAYS BASE 65 °F:													
Heating	1188	819	952	508	227	18	0	0	104	219	593	761	5389
Cooling	0	0	0	0	7	207	258	313	61	0	0	0	846
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)													
Sunrise - Sunset	6.7	6.9	6.5	6.5	7.0	5.9	6.4	5.6	5.0	6.9	5.6	7.1	6.3
Midnight - Midnight													
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	6	7	7	9	4	6	9	9	10	6	11	5	89
-Partly Cloudy	10	5	10	6	11	13	7	10	11	4	3	8	98
-Cloudy	15	17	14	15	16	11	15	12	9	21	16	18	179
Precipitation .01 inches or more	13	12	12	7	14	10	11	8	7	8	10	13	125
Snow, Ice pellets 1.0 inches or more	4	0	4	0	0	0	0	0	0	0	0	1	9
Thunderstorms	0	0	1	2	5	4	6	2	1	1	0	1	23
Heavy Fog, visibility 1/4 mile or less	3	8	0	5	4	3	2	0	0	3	2	1	31
Temperature °F													
-Maximum													
90° and above	0	0	0	0	0	5	2	2	0	0	0	0	9
32° and below	14	2	5	0	0	0	0	0	0	0	0	1	22
-Minimum													
32° and below	28	17	19	2	0	0	0	0	0	0	10	13	89
0° and below	1	0	0	0	0	0	0	0	0	0	0	0	1
AVG. STATION PRESS. (mb)													
RELATIVE HUMIDITY (%)													
Hour 01	76	78	69	74	73	75	79	80	79	86	78	78	77
Hour 07 (Local Time)	65	67	54	60	59	56	63	62	54	70	58	66	61
Hour 13	71	71	58	67	64	66	71	72	65	77	64	72	68
Hour 19													
PRECIPITATION (inches):													
Water Equivalent													
-Total	1.52	4.72	3.49	4.37	8.14	3.53	6.54	1.23	2.24	2.79	1.63	2.56	42.96
-Greatest (24 hrs)	0.53	2.05	1.67	1.66	2.28	1.14	2.01	0.69	1.00	1.24	1.07	0.95	2.28
-Date	10-11	28	13-14	4- 5	30-31	24-25	7	1- 2	3- 4	28-29	11-12	5- 6	MAY 30-31
Snow, Ice pellets													
-Total	11.5	T	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	1.5	21.4
-Greatest (24 hrs)	4.6	T	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	T	1.0	4.6
-Date	18-19	28	8- 9								13	27	JAN 18-19
WIND:													
Resultant													
-Direction (!!!)													
-Speed (mph)													
Average Speed (mph)													
Fastest Obs. 1 Min.													
-Direction (!!!)	30	07	07	06	27	27	08	34	22	23	24	07	07
-Speed (mph)	23	31	38	26	23	35	25	24	22	30	30	31	38
-Date	31	28	28	23	1	11	27	16	20	3	16	6	MAR 28
PEAK GUST													
-direction (!!!)	N	NE	NE	NW	W	W	W	N		S	NW		
-Speed (mph)	35	41	52	39	38	48	37	35	39	36	46	41	52
-Date	11	28	29	21	1	11	16	16	3	1	14	6	MAR 29

(!!!) See Reference Notes on Page 68

b. Survey Data

STA	B.S.	H.I.	F.S.	ELEV
B.M.	7.885			21.879
TP # 1			.89	
TP # 1	.41			
TP # 2			10.92	
TP # 2	.37			
TP # 3			5.44	
TP # 3	[illegible]			
TP # 4			7.21	
TP # 4	2.34			
TP # 5			6.69	
TP # 5	4.67			
Brass [illegible]			5.59	4.669
	Return	Run		
Brass Ring	5.67			
TP # 5			4.74	
TP # 5	4.77			
TP # 4			2.41	

[illegible] Sunny

August 5, 1987

J. Thow

D. Strack

Level Run

New Haven Harbor

DIETZGEN NO. 384-6

	BS	HI	FS	ELEV
[illegible]	7.205			
			3.77	
TP 3	5.27			
TP 2			.205	
[illegible]	10.73			
[illegible]			.50	
TP 1	1.26			
[illegible]			8.255	21.874
	56.635		56.62	

B.M. is A Standard Disk
[illegible]
Sta 65 [illegible] RM10
At Intersection of Sidewalks
On Corner of Howard And Fifth St.

STA	S	HI	F.S.		
STA-9				4.669	
N-1			6.12	4.079	- 4.08
S-1			5.95	4.749	- 4.75

HORZ
DIST

305 91

80° SURVEY
AUGUST 11, 1980

J. TREW
D. STOCKS

NEW HAVEN HARBOR
SAT STATION 13A

DIETZGEN NO. 384-6

332°14'16"
332°14'20"
332°14'18"   332°14'18.2"
332°14'19"
332°14'17"   27°45'41.8"
332°14'19"
~~332°14'18"~~

27°45'40.2"

27°45'41"
27°45'39"
27°45'38"
27°45'36"   27°45'38.5"
27°45'38"
27°45'39"

π, 14

August 11 1982

D. Strack

Establish Coordinates
of Transponder

DIETZGEN NO. 384-8

Sta			
Sta	[illegible]		
	[illegible]	291°56'01.3"	
	[illegible]	68°03'58.7"	
	[illegible]	291°55'57.2"	
	[illegible]	68°04'02.8"	
		68°04'01"	
	[illegible]	68°04'01.7"	

Sta		
"	327°13'49"	
"	327°13'49"	
"	327°13'50"	
"	327°13'48"	327°13'48.5"
"	327°13'47"	
Sta-5	327°13'48"	
π@16 BS Light ~~BS 5~~		32°46'11.50"
		32°46'11.9"
"	32°46'14"	
"	32°46'12"	
"	32°46'12"	
"	32°46'13" [uncertain]	32°46'12.3"
"	32°46'11"	
Light House	32°46'12"	
π@16		
BS 5		

Triangulation

∡6	R	70°45'45"	
∡5	D	178°58'03"	
∡4	R	287°10'36"	
∡3	D	35°22'54"	
∡2	R	143°35'24"	
∡1	D	251°47'45"	
∡6-6A	R	70°45'54"	
∡5-6A	RD	178°58'12"	
∡4-6A	RR	287°10'24"	
∡3-6A	D	35°22'45"	
∡2-6A	DR	143°35'19"	70°45'44"
∡1-6A	D	251°47'54"	
T@5			1510.4544
BS@9			Ave 251°47'373"
∡6-6A	R	70°45'33"	
∡5-6A	R	178°57'54"	
∡4-6A	R	287°10'07"	
∡3-6A	D	35°22'30"	
∡2-6A	D	143°34'54"	
∡1-6A	D	251°47'39"	
T@5			
BS@9			

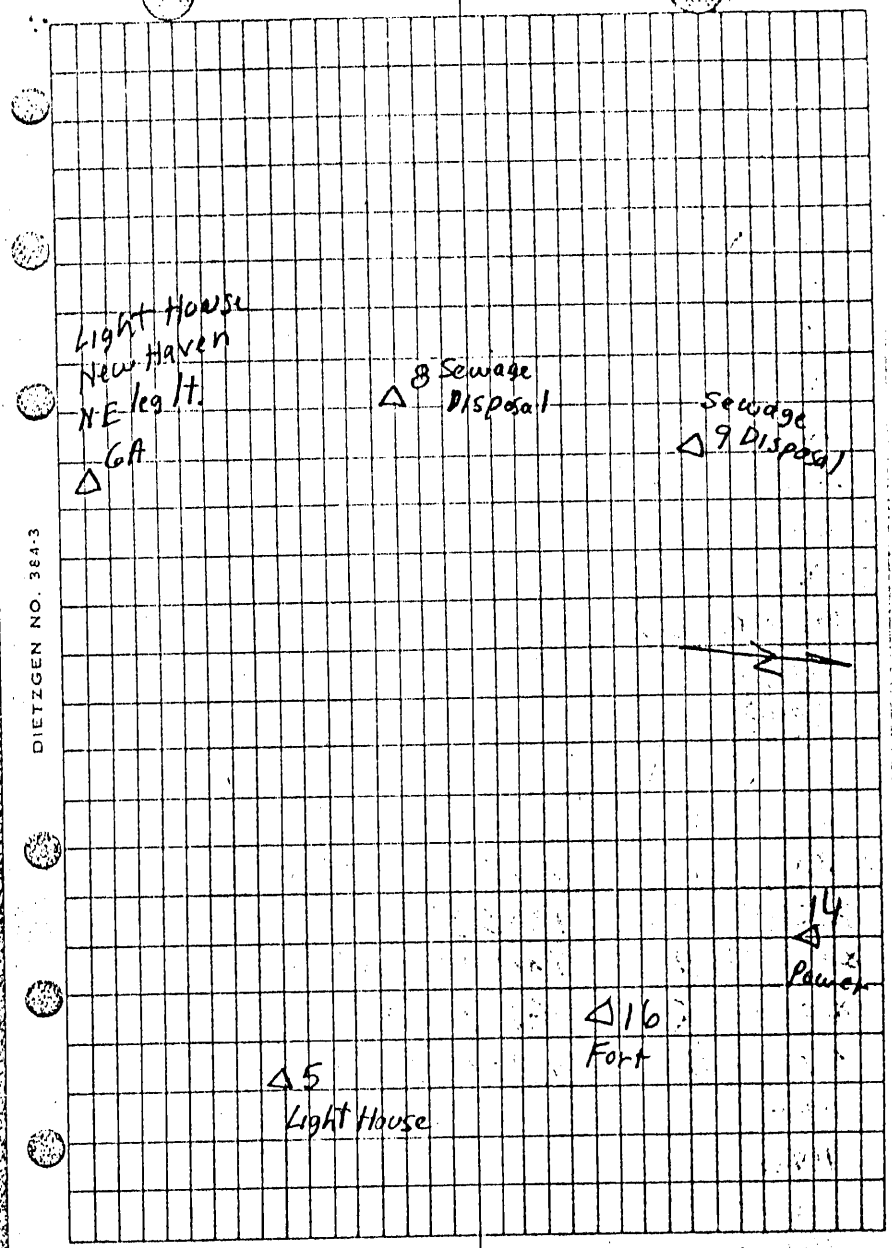
Triangulation to Establish
Point on West Breakwater
8-11-87
Sta @ Light House
Sta # 6

DIETZGEN NO. 384-3

2

9 Δ6	R				
9 Δ5	D				
9 Δ4	R				
9 Δ3	D				
9 Δ2	R				
9 Fs @ Δ1	D				
T@S					
B@S					
Δ6	R	200	50	27"	
Δ5	D	287	22	00"	
Δ4	R	13	53	32"	
Δ3	D	100	25	20"	
Δ2	R	186	57	00"	
Δ1	D	273	28	36"	
T@S					
B@S					

1



DIETZGEN NO. 384-3

6

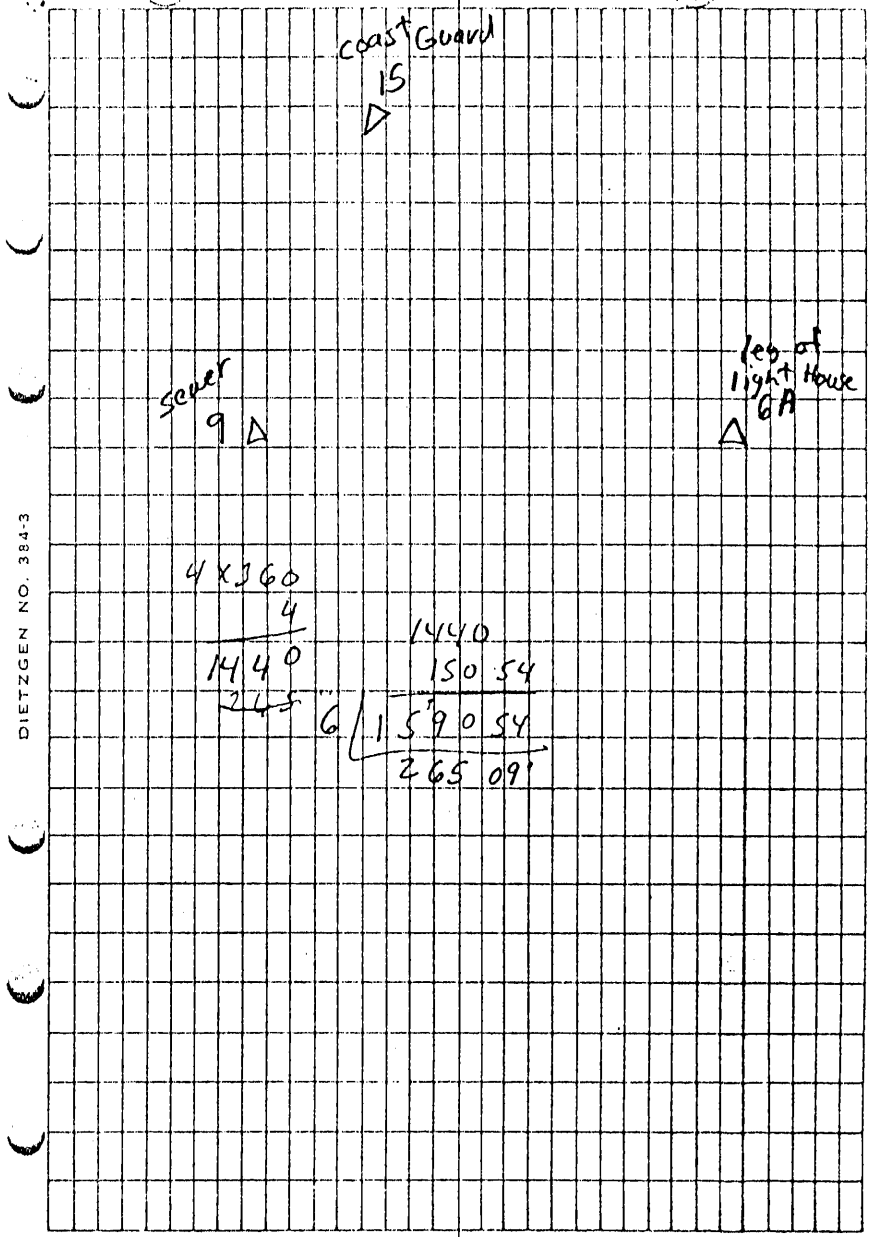
∠6 150°54'00"
∠1 265°09'00"

∠6 150°53'57"
∠1 265°08'57"

∠6 150°54'06"
∠1 265°09'03"

T@15
BS@9

6



DIETZGEN NO. 384-3

4

∠6		297°59'48"
∠5		68°19'27"
∠4		198°40'03"
∠3		329°00'00"
∠2		~~99°00'19"~~ 99°19'59"
∠1		229°40'18"
∠6		297°59'42"
∠5		68°19'24"
∠4		198°39'42"
∠3		328°59'40"
∠2		99°20'00"
∠1		229°40'09"
∠6	R	297°59'48"
∠5	D	68°19'36"
∠4	R	198°40'12"
∠3	D	329°00'03"
∠2	R	99°20'06"
∠1	D	229°40'15"
T@S		
BS@16		

1377°59'48"/6

297°59'48"

Ave 229°39'58"

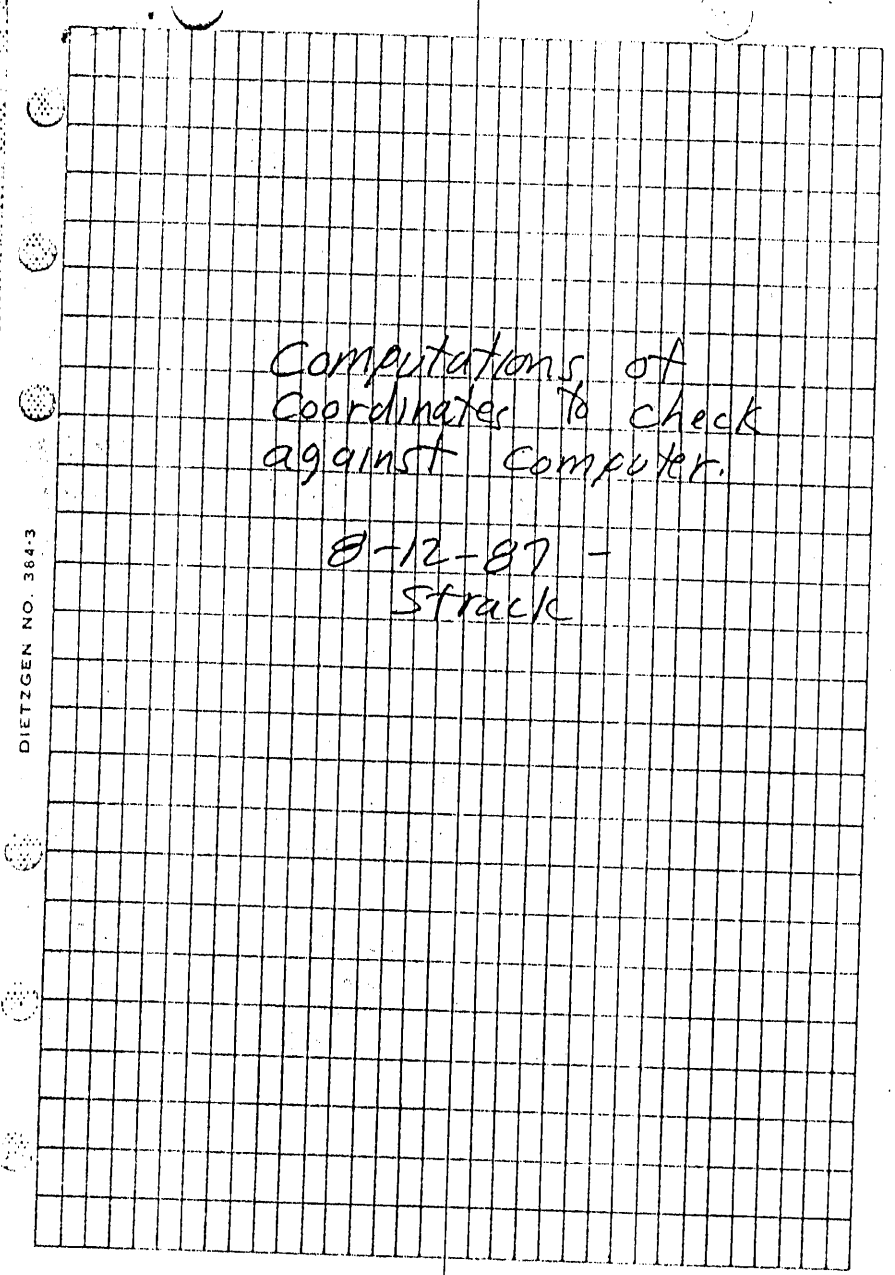
3

∠6	R	308°01'18"
∠5	D	76°41'09"
∠4	R	205°20'57"
∠3	D	334°00'39"
∠2	R	102°40'30"
∠1	D	231°20'24"
∠6	R	308°00'51"
∠5	D	76°40'27"
∠4	R	205°20'30"
∠3	D	334°00'12"
∠2	R	102°40'12"
∠1	D	231°20'12"
∠6	R	308°00'36"
∠5	D	76°40'18"
∠4	R	205°20'24"
∠3	D	334°00'06"
∠2	R	102°40'06"
6A-∠1	D	231°20'00"
T@5		
BS@14		

3

∠6	308°00'54"	1388.0054"
∠5	76°40'42"	
∠4	205°20'36"	
∠3	334°00'30"	
∠2	102°40'20"	
∠1	231°20'18"	

DIETZGEN NO. 364-3


Computations of
Coordinates to check
against computer.
8-12-87 -
Strack
DIETZGEN NO. 364-3

	N	E
11	168983.20	555811.74
13 ↓	167284.74	556592.03
	− 1698.46	+ 780.29
	1869.12	S 24°40'28" E

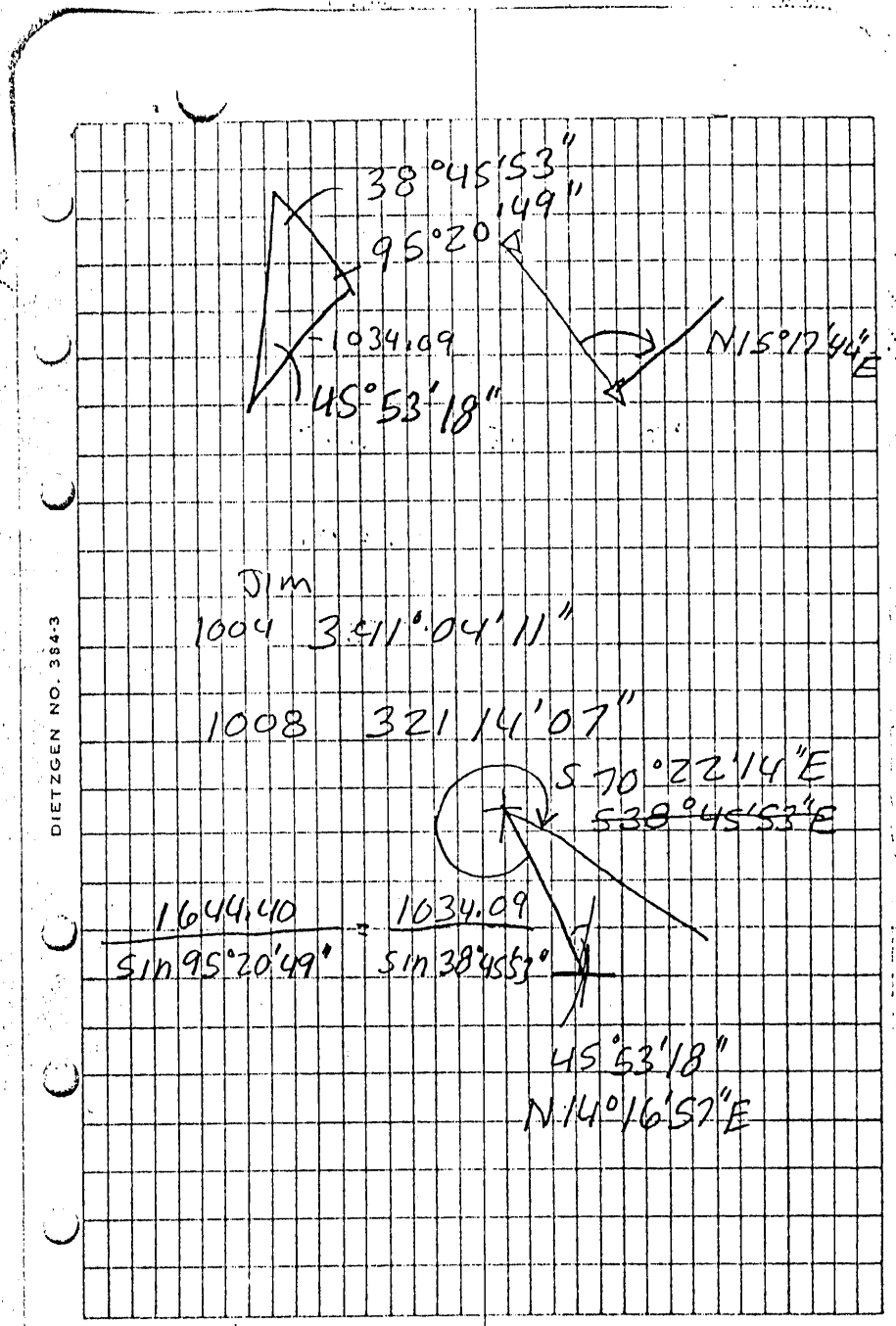
39° 58 12 308.91

	167284.74	556592.03
13 N 15°17'44" E 308.91	+ 297.97	+ 81.49
13A	167582.71	556673.52

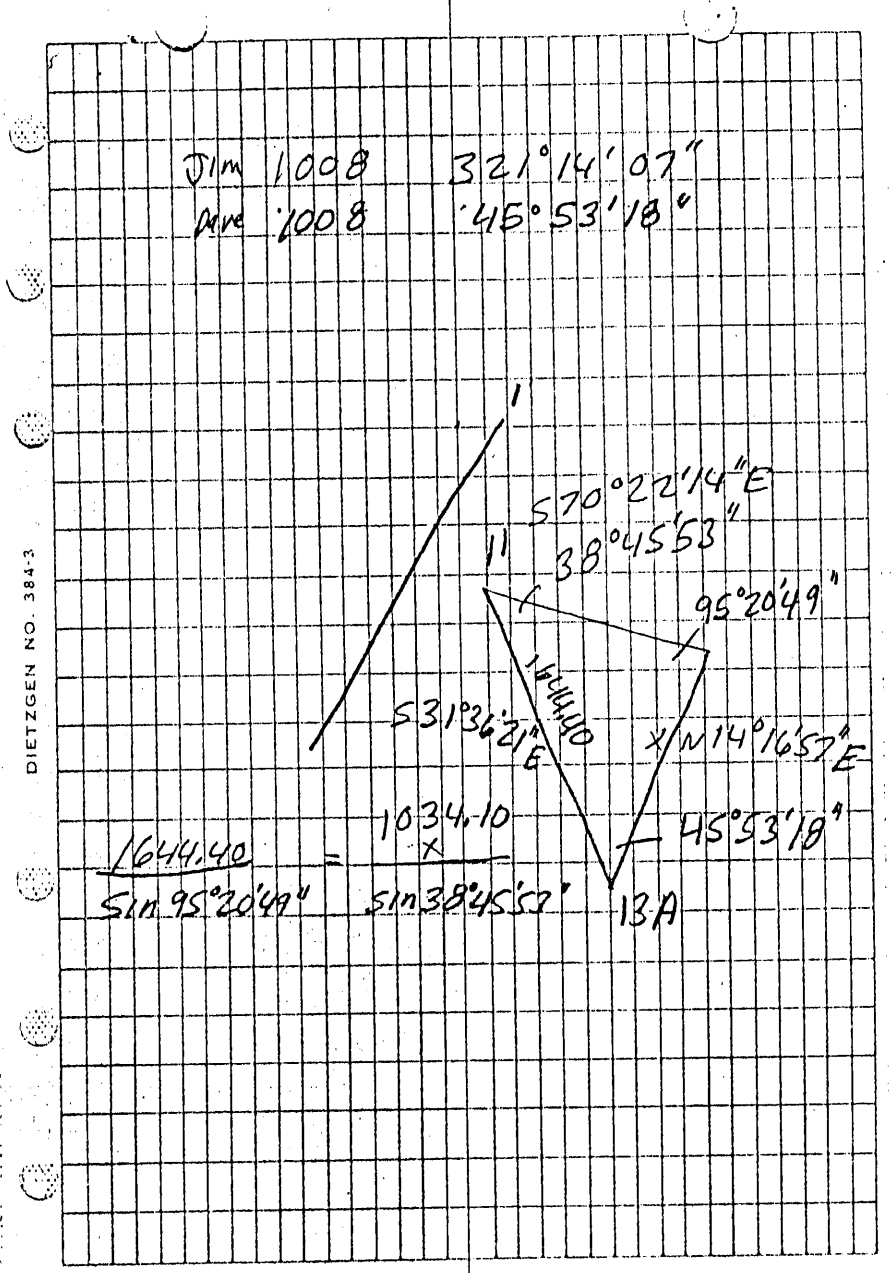
11	168983.20	555811.74
13A ↓	167582.71	556673.52
	1460.49	861.78

1644.40
S 31°36'21" E

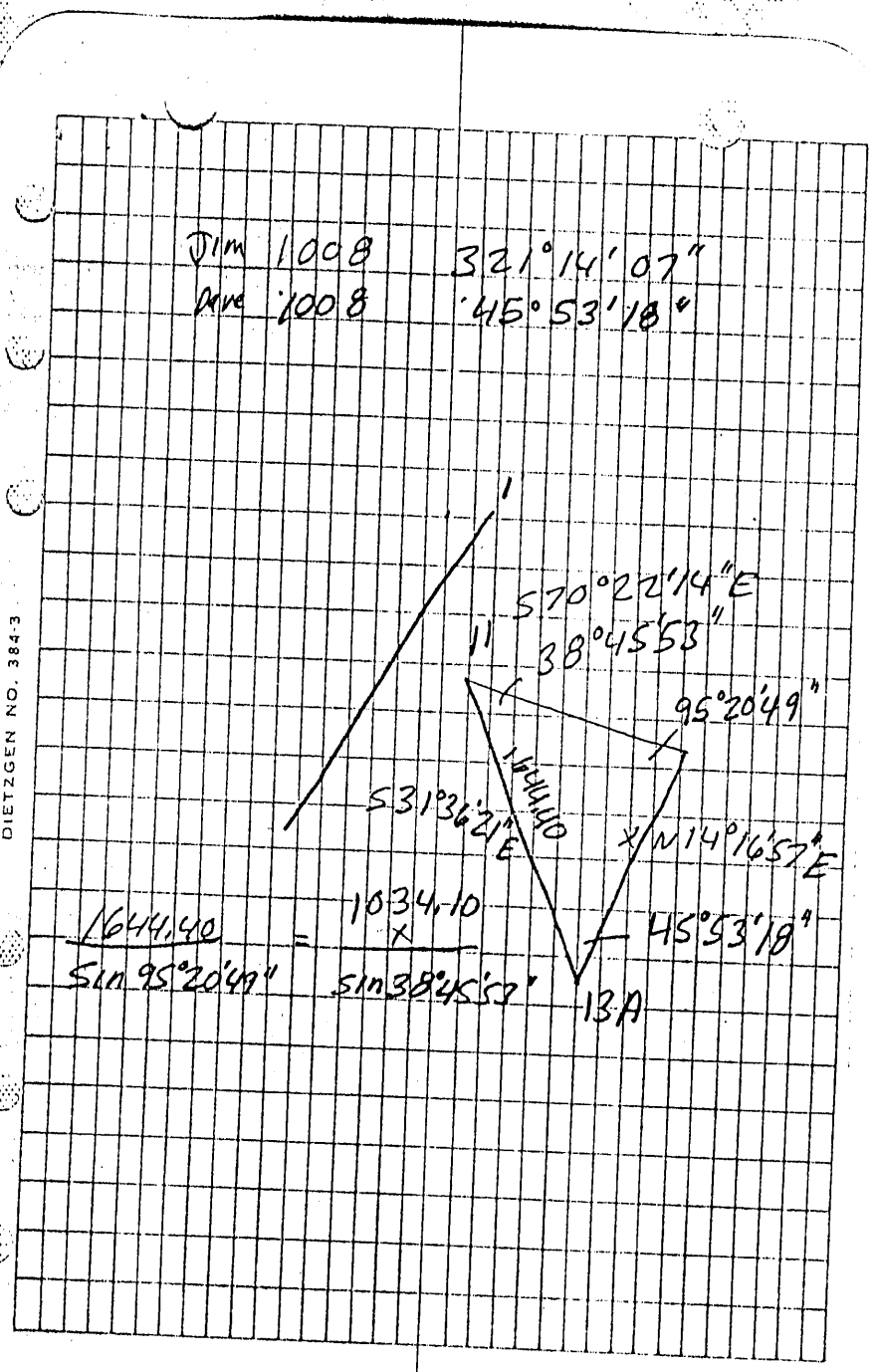
13A.	167582.71	556673.52
N 14°16'57" E 1034.09	1002.13	255.11
1008	168584.84	556928.63

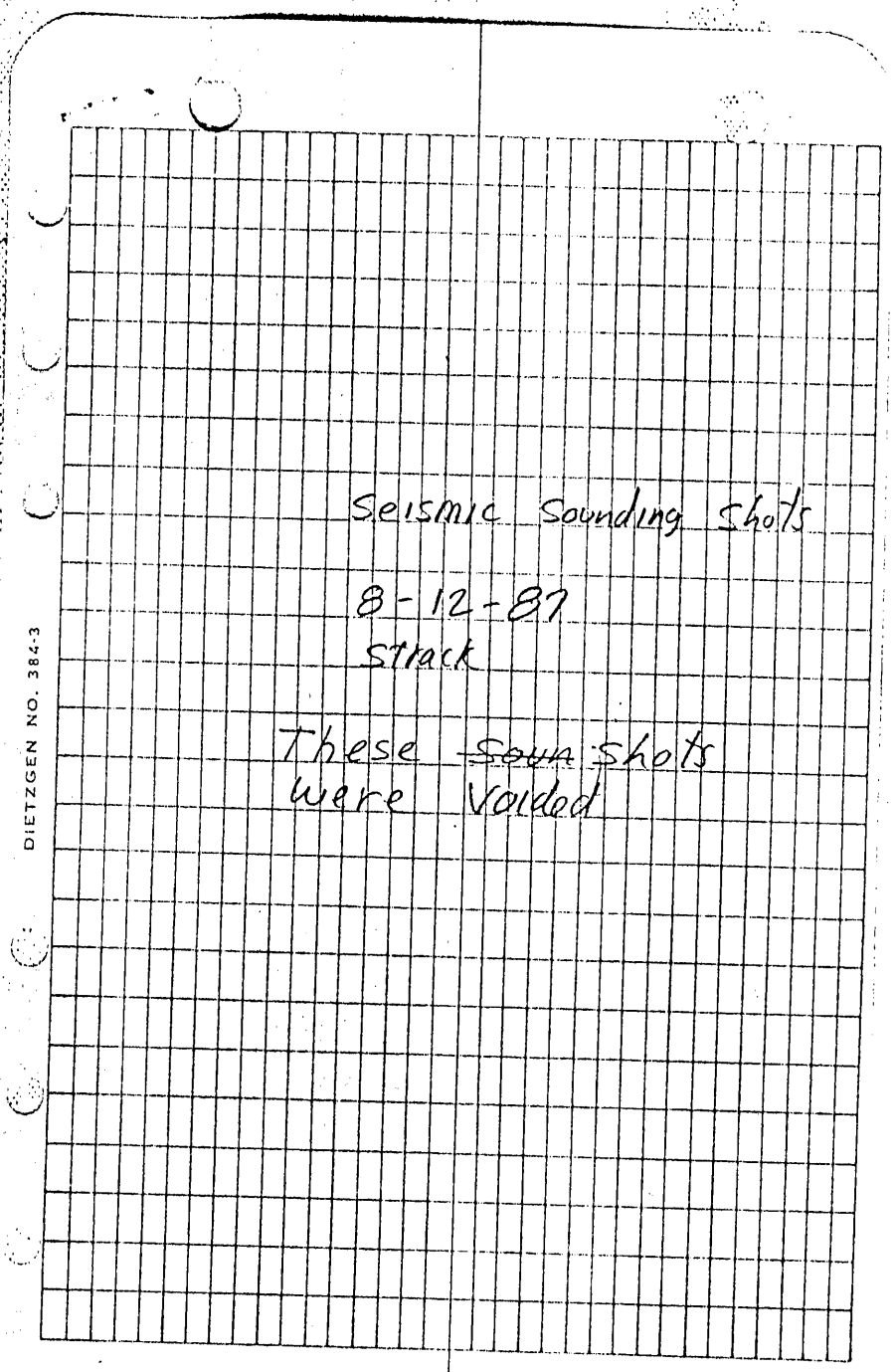


DIETZGEN NO. 384-3



DIETZGEN NO. 384-3


Dim 1008 321°14'07"
Dire 1008 45°53'18"
1
570°22'14"E
11
38°45'53"
95°20'49"
531°36'21"E
1644.40
N14°16'57"E
45°53'18"
1034.10
1644.40 / Sin 95°20'49" = 1034.10 / Sin 38°45'53"
13A

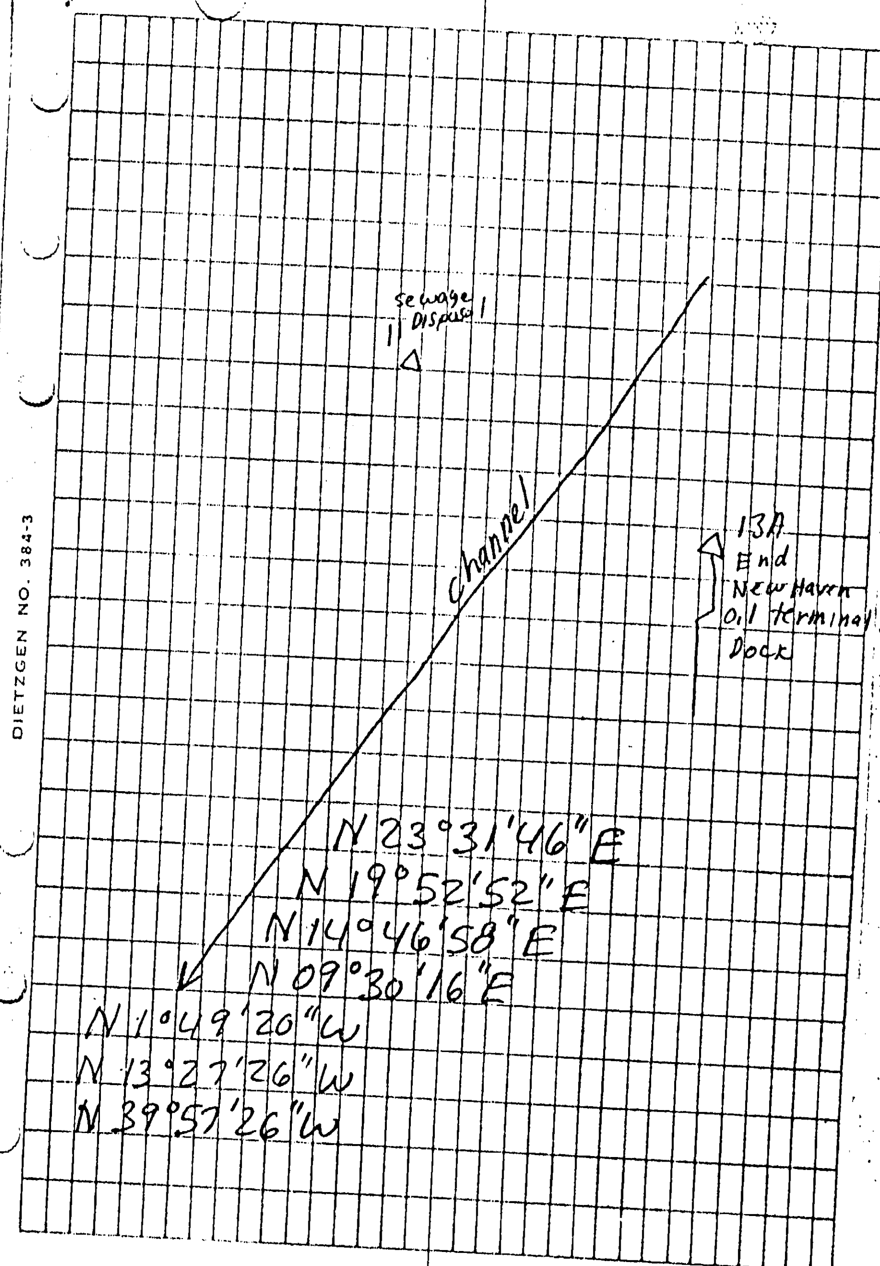

Seismic Sounding Shots
8-12-87
Stack
These ~~Soun~~ Shots
were Voided
DIETZGEN NO. 384-3

Shots were Voided

End 1/1000	
1012	54°38'06"
1010	50°59'12"
1008	45°53'18"
1006	40°36'36"
1004	29°17'00"
1002	17°38'54"
1/1000 1000	~~352°12'06"~~ 351°08'54"

⊼@13A
BS@11

DIETZGEN NO. 384-3



CK CD00Z4

Check Shots 13, 13A to 11

~~Seismic Sounding Shots~~

~~2nd Run after recalibration~~

8-12-87

Struck

DIETZGEN NO. 364-3

11-13		1868.50
11-13A		1643.82

STA [illegible]

1012	307°05'28"
1010	313°03'59"
1008	321°14'07"
1006	327°32'57"
1004	341°04'11"
1002	350°06'03"
1000	4°20'01"
Tie II	
BS 13A	

August 12, 1987

Sunny 80°

J. Jones

D. Strack

New Hanover Harbor

Seismic Locations

1ST Run is Run 1000
If is Base Line from South To North
DIETZGEN NO. 3646

8012	111°25'24"	N 1°24'25" E
8010	106°40'24"	N 3°20'35" W
8008	101°00'18"	N 9°00'41" W
8006	95°24'45"	N 14°36'14" W
8004	87°44'45"	N 22°16'14" W
8002	79°16'12"	N 30°44'47" W
8000	61°06'39"	N 48°54'20" W
Begin line 8000		
End line 1100		
1112	127°38'30"	N 17°32'31" E
1110	123°26'33"	N 13°25'34" E
1008	119°50'06"	N 7°49'07" E
1106	114°27'06"	N 4°26'02" E
1104	105°26'03"	N 4°34'58" W
1102	96°47'00"	N 13°13'59" W
~~1000~~ 1100	85°44'24"	N 24°16'35" W
Begin Line ~~1000~~ 1100		
T@13		
B@10		

Seismic Soundings
8-H^3-87
2nd Run After
Recalibration

Track

DIETZGEN NO. 334-3

2

9022	S 42°24'21" W	332°20'48"	
9020	S 47°00'43" W	337°01'42"	
9018	S 53°27'49" W	343°28'48"	
9016	S 60°00'31" W	350°01'30"	
9014	S 69°31'31" W	359°32'30"	
9012	S 79°26'55" W	9°27'54"	
9010	N 88°00'47" W	22°00'12"	
9008	N 75°34'47" W	34°26'12"	Marked Early
9006	N 64°00'05" W	46°00'54"	
9004	N 52°21'59" W	57°39'00"	Marked Earlier
9002	N 44°55'23" W	65°05'36"	
9000	N 35°21'11" W	74°39'48"	
Line 9000			
End line 1500			
1514		122°32'24"	N 12°31'25" E
1512		119°51'12"	N 9°56'13" E
1510		117°18'00"	N 7°17'01" E
1508		110°32'18"	N 0°31'19" E
1506		104°38'12"	N 5°22'47" W
1504		96°54'48"	N 13°06'11" W
1502		87°27'09"	N 22°33'35" W
1500		76°49'24"	N 33°11'35" W
line 1500			
Π@13			
Bs@10			

1

342°45'44"

345°54'21"

Jim
347 13 26

350 42 25

DIETZGEN NO. 384-3

3

End line 9000

9050	S 20°02'13" W	310°03'12"
9048	S 20°53'46" W	310°54'45"
9046	S 21°36'01" W	311°37'00"
9044	S 22°29'13" W	312°30'12"
9042	S 23°05'13" W	313°06'12"
9040	S 24°05'58" W	314°06'57"
9038	S 24°58'37" W	314°59'36"
9036	S 26°39'19" W	316°40'18"
9034	S 27°51'07" W	317°52'06"
9032	S 29°07'01" W	319°08'00"
9030	S 30°58'07" W	320°59'06"
9028	S 33°15'07" W	323°16'06"
9026	S 36°03'34" W	326°04'33"
9024	S 38°59'31" W	329°00'30"

TI @ 13

BS @ 10

2

344°10'39"

Jim

344°46'10"

341°58'07"

4 2046	S12°23'18"W	302° 24' 15" (100' side line)
2044	S13°02'10"W	303°03'09"
2042	S14°58'01"	304° 57'00"
2040	S15°27'01"W	305° 28' 00"
2038	S15°20'43"W	305° 21' 42"
2036	S15°53'25"W	305° 53' 24"
2034	S16°51'40"W	306°52'39"
2032	S17°27'43"W	307°28'42"
2030	S17°42'43"W	307° 47' 42"
2028	S18°45'04"W	308°46'03"
2026	S20°36'04"W	310°37'03"
2024	S21°14'19"W	311° 15' 18"
2022	S24°01'19"W	314°02'18"
2020	S25°54'31"W	315°55'30"
2018	S29°05'43"W	319°06'42"
2016	S33°06'43"W	323°07'42"
2014	S40°20'58"W	330°21'57"
2012	S48°54'48"W	338°55'45"
2010	S68°26'07"W	358°21'06"
2008	N87°57'41"W	22°03'18"
2006	N68°52'26"W	48°08'33"
2004	N40°50'44"W	69°10'15"
2002	N29°22'53"W	80°38'06"
2001	N20°06'59"W	89°52'00"
Begin 2000		
PT@13		
BS@10		

56° 46' 28"

5

2110	S 14°39'13" W	304° 40' 12"
2108	S 15°20'25" W	305° 21' 24"
2106	S 16°43'01" W	306° 44' 00"
2104	S 18°53'31" W	308° 54' 30"
2102	S 22°08'25" W	312° 09' 24"
2100	S 24°37'19" W	314° 38' 18"
Begin 2100		
End 9100		3+
9106	S 53°21'31" W	343° 22' 30"
9104	S 58°04'31" W	348° 05' 30"
9102	S 63°01'13" W	353° 02' 12"
9100	S 68°58'01" W	358° 59' 00"
Begin line 9100		~~358° 59' 00"~~
End line 9200		
9212	S 42°26'34" W	332° 27' 33"
9210	S 46°57'49" W	336° 58' 48"
9208	S 51°01'43" W	341° 02' 42"
9206	S 56°37'31" W	346° 38' 30"
9204	S 62°08'07" W	352° 07' 06"
9202	S 70°03'55" W	0° 03' 54"
9200	S 82°24'31" W	12° 25' 30"

Bad 2's shot

line 9200
π @ 13
BS @ 10

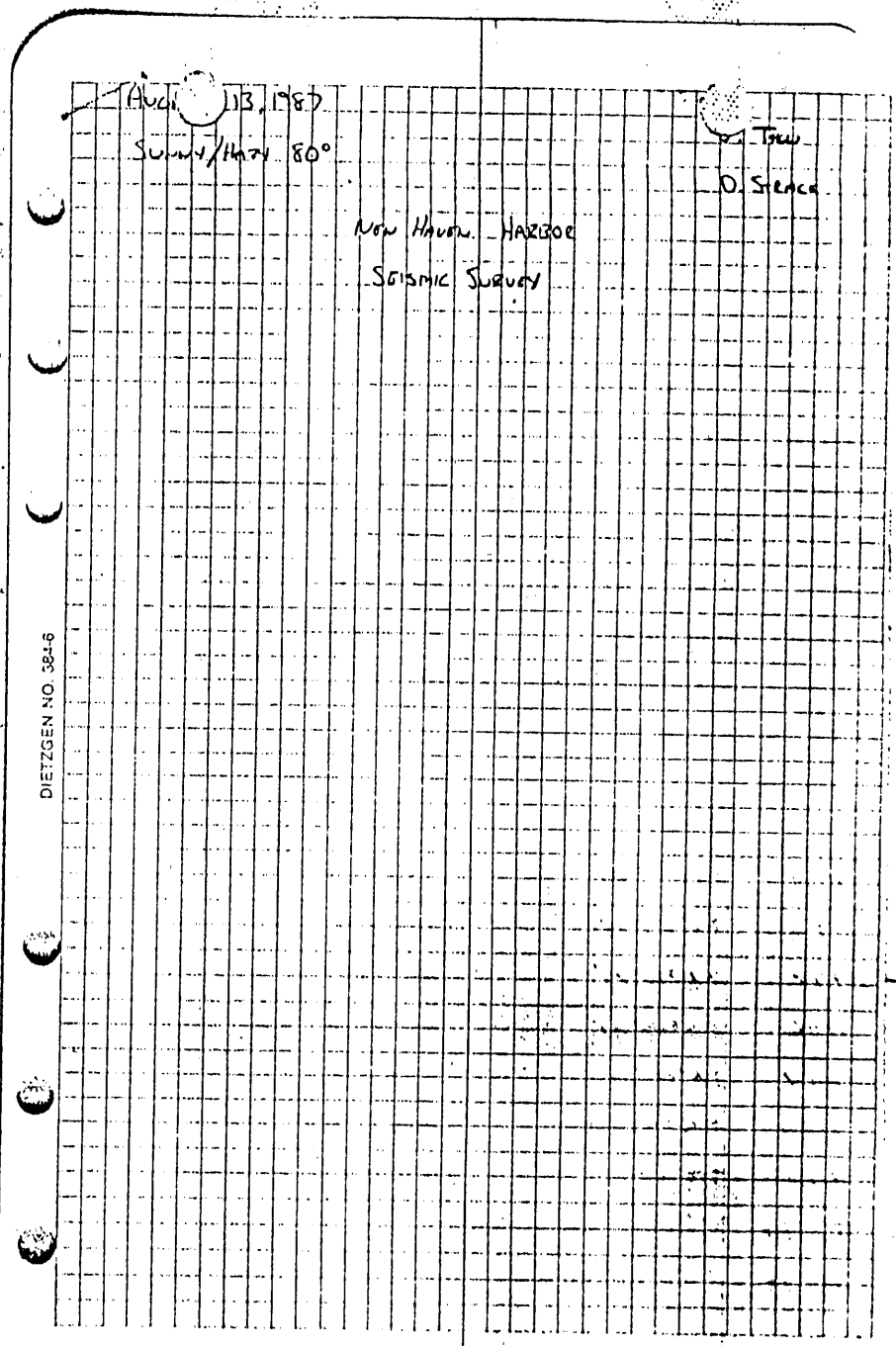
50° 44' 09"

4 5

DIETZGEN NO. 384-3

349° 48' 53"

Sta			Bearing
8012	342°45'44"		N 52°44'45" E
8010	343°05'25"		N 53°04'26" E
8008	343°21'35"		N 53°20'36" E
8006	343°37'10"		N 53°36'11" E
8004	344°33'41"		N 54°32'42" E
8002	344°30'40"		N 54°29'41" E
8000	345°54'21"		N 55°53'22" E
Tie 10		Line 8000	
BS 13			
1112	347°13'26"		N 57°12'27" E
1110	347°27'55"		N 57°26'56" E
1108	348°14'39"		N 58°13'40" E
1106	348°48'01"		N 58°47'02" E
1104	348°55'21"		N 58°54'22" E
1102	349°49'15"		N 59°48'16" E
1100	350°42'25"		N 60°41'26" E
Tie 10		Line 1100	
BS 13			



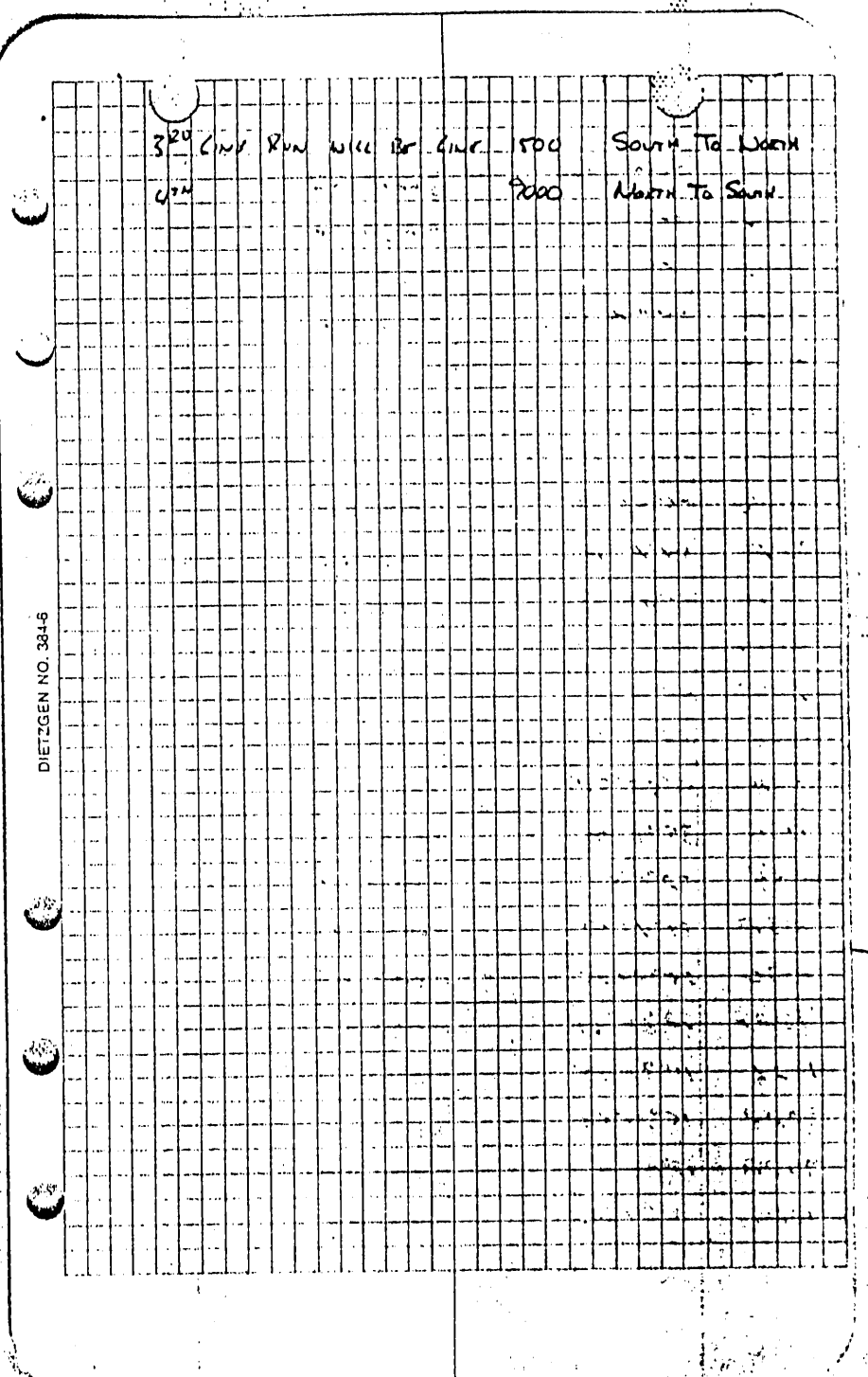
STA	Dire ∠		
9018	5°51'28"		N 75°50'24" E
9016	3°04'56"		N 73°03'57" E
9014	08'31"		N 71°22'11" E
9012	357°44'39"		N 67°43'40" E
9010	354°56'25"		N 64°55'26" E
9008	352°47'20"		N 62°46'21" E
9006	350°21'22"		N 60°20'23" E
9004	348°37'36"		N 58°36'37" E
9002	346°16'52"		N 56°15'53" E
9000	344°10'39"		N 54°09'40" E
π @ 10		Line 9000	
BS 13			
1514	344°46'10"		N 54°45'11" E
1512	345°14'40"		N 55°13'41" E
1510	345°28'18"		N 55°25'19" E
1508	346°01'39"		N 56°00'40" E
1506	346°34'28"		N 56°33'29" E
1504	347°09'23"		N 57°08'24" E
1502	347°42'19"		N 57°41'20" E
1500	347°58'02"		N 57°57'01" E
π @ 10		Line 1500	
BS 13			

DIETZGEN NO. 384-5

1st Line To Run Will Be Line 1100 South To North

2nd 8000 South To North

Sta	Azes		
2006	355°46'54"		N65°45'55"E
2004	353°52'28"		N63°51'29"E
2002	351°42'01"		N61°41'02"E
2000	349°48'53"		N57°47'54"E
Tie 10		Line 2000	
BS 13			
9050	56°46'23"		S53°14'36"E
9048	54°48'38"		S55°44'21"E
9046	51°25'03"		S58°35'56"E
9044	48°29'27"		S61°31'32"E
9042	45°16'05"		S64°44'54"E
9040	42°08'36"		S67°52'23"E
9038	38°52'31"		S71°08'28"E
9036	35°40'50"		S74°20'09"E
9034	32°10'52"		S77°50'07"E
9032	28°49'40"		S81°11'19"E
9030	25°22'05"		S84°38'54"E
9028	22°08'37"		S87°52'22"E
9026	18°37'00"		N88°36'01"E
9024	15°21'53"		N85°20'54"E
9022	12°09'11"		N82°08'12"E
9020	9°04'21"		N78°52'44"E



STA	'URZ 3		
2046	50°44'05"		S 59°16'50" E
2044	47°40'36"		S 62°20'23" E
2042	45°28'03"		S 64°32'56" E
2040	42°35'23"		S 67°25'36" E
2038	39°48'06"		S 70°12'53" E
2036	36°47'27"		S 73°13'32" E
2034	33°54'09"		S 76°06'50" E
2032	30°55'42"		S 79°05'17" E
2030	27°53'33"		S 82°07'26" E
2028	25°00'50"		S 85°00'09" E
2026	21°56'25"		S 88°04'34" E
2024	19°05'48"		N 87°04'49" E
2022	16°07'41"		N 86°06'42" E
2020	13°18'39"		N 83°17'40" E
2018	10°35'06"		N 80°34'07" E
2016	7°54'33"		N 77°53'34" E
2014	5°17'21"		N 75°16'22" E
2012	2°52'12"		N 72°51'13" E
2010	12'24"		N 70°11'25" E
2008	358°04'03"		N 68°03'04" E

5TH Line Run WKL Br Line 2000 North To South

DIETZGEN NO. 384-6

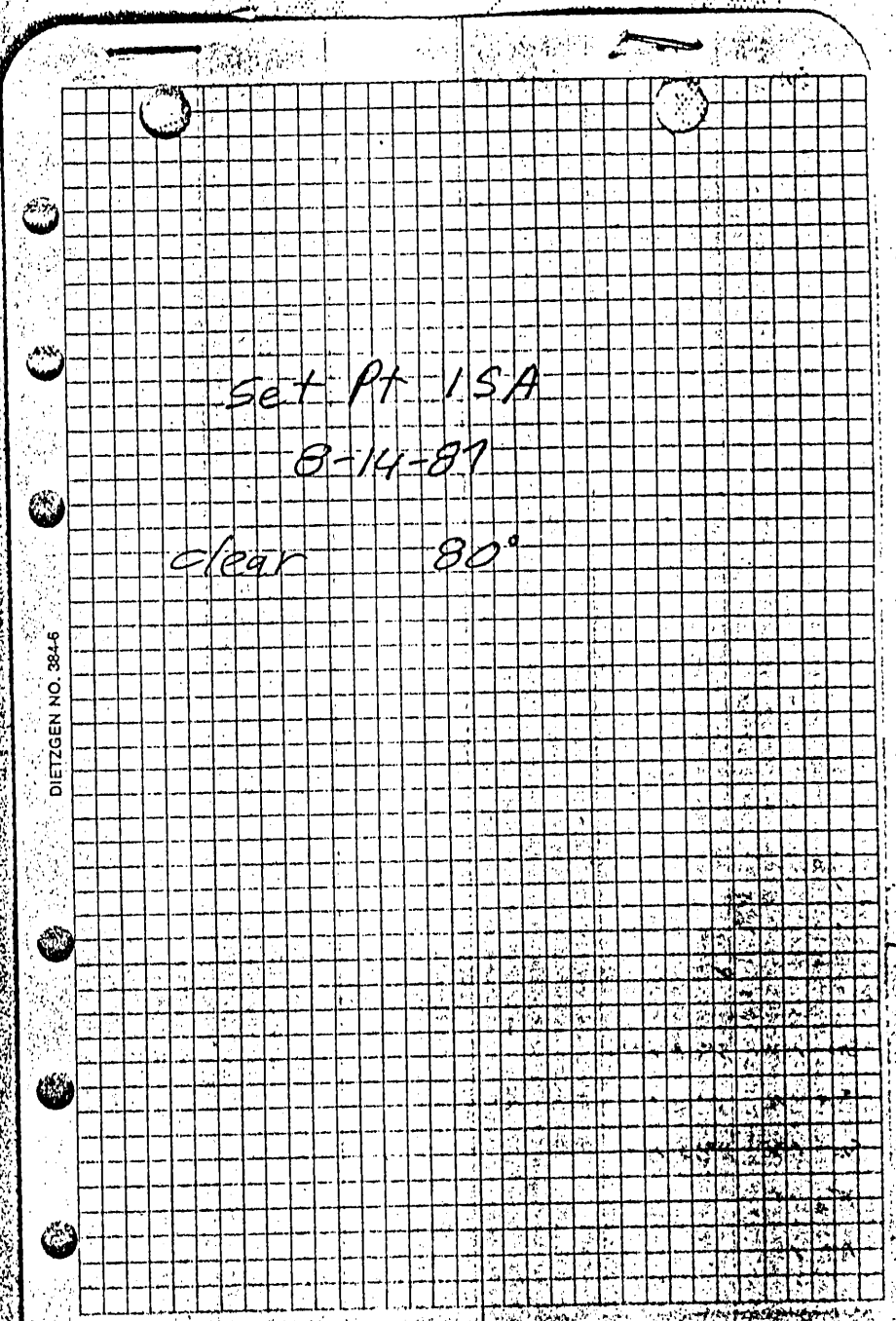
Sta	Horz ∠		
2106	13°51'23"		S 83°50'24" E
2104	11°11'52"		S 81°10'53" E
2102	8°51'39"		S 78°50'40" E
2100	6°55'24"		S 76°54'25" E
Tie 10		Line 2160	
BS 13			
9106	10°55'06"		S 80°54'07" E
9104	7°15'08"		S 77°14'09" E
9102	3°48'54"		S 73°47'55" E
9100	31'03"		S 70°30'04" E
Tie 10		Line 9100	
BS 13			
9212	16°11'35"		S 86°10'36" E
9210	12°33'18"		S 82°32'28" E
9208	9°17'50"		S 79°16'51" E
9206	5°57'09"		S 75°56'10" E
9204	3°10'37"		S 73°09'38" E
9202	359°58'45"		S 69°57'48" E
9200	355°55'41"		S 65°54'42" E
Tie 10		Line 9200	
BS 13			

STA	VERTEX			
2110	19°24'43"		N 89°23'44" E	
2108	16°45'27"		N 56°44'21" E	

6TH LINE TO BE RUN WILL BE 9200 NORTH TO SOUTH
7TH 9100 NW TO SO
8TH 2100

DIETZGEN NO. 384-6

Sta	∠ R	Horz Dist
Sta - 15A	3°02'15"	
Sta - 16	0°00'	765.70
Sta - 15A	3°02'14"	790.23
π_2 15		
BS 16		



August 14, 1987

P. Cloudy 75°

New Haven Harbor

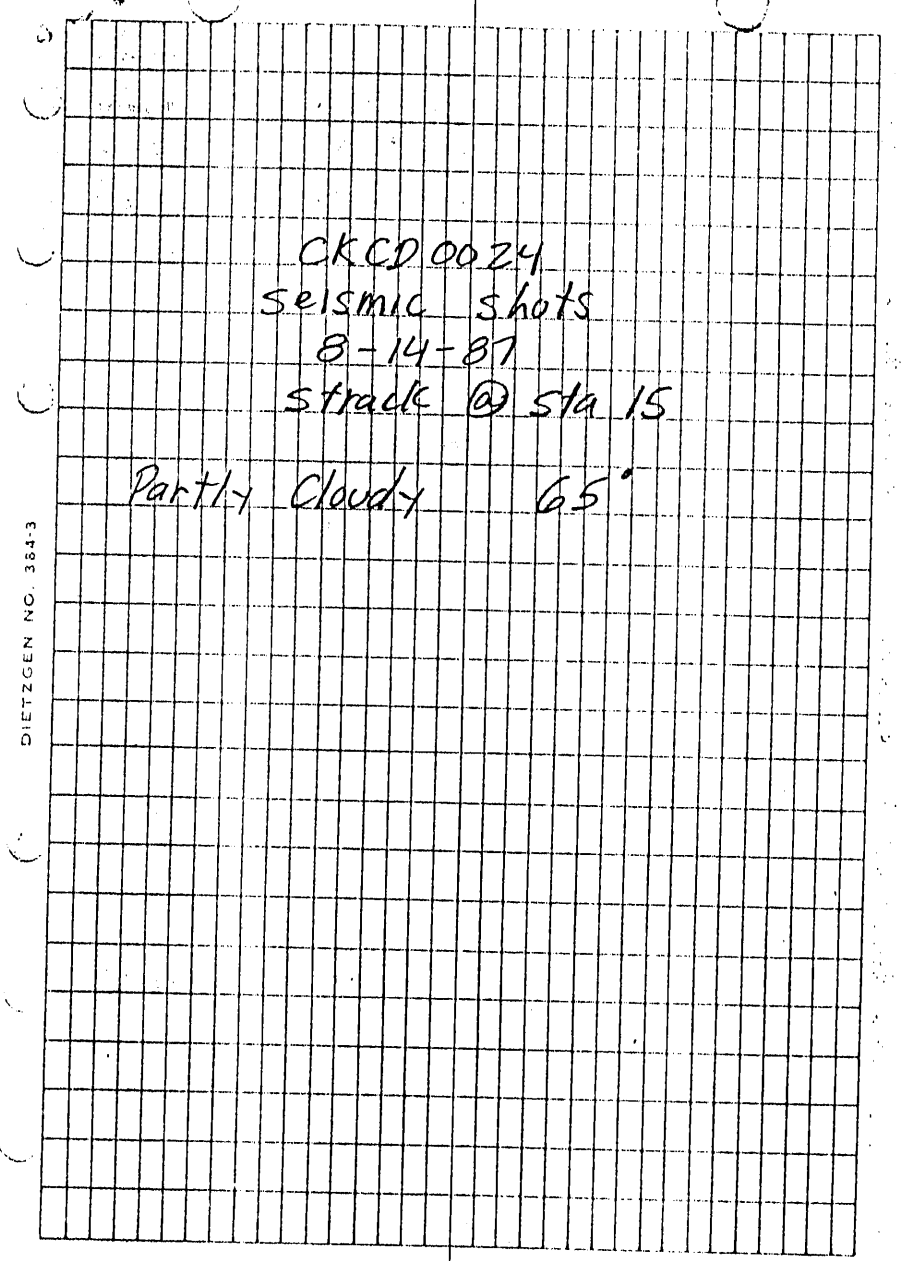
Seismic Locations

T. Thon

D. Strack

Sta			
3520	341°36'22"		N 58°21'02" E
3500	327°58'21"		N 44°42'48" E
Tie 8		Line 3500	
BS 15			
10036	354°34'19"		N 71°18'54" E
10020	340°29'47"		N 57°14'22" E
10000	326°56'30"		N 43°41'05" E
Tie 8		Line 10000	
BS 15			
3036	358°37'49"		N 73°22'24" E
3020	342°34'00"		N 59°18'35" E
3000	329°07'03"		N 45°51'38" E
Tie 8		Line 3000	
BS 15			
2540	328°29'34"		N 45°N'50" E
2520	320°58'40"		N 37°43'N" E
2510	317°59'03"		N 34°43'38" E
2500	314°55'11"		N 31°22'46" E
Tie 8		Line 2500	
BS 15			

Sta			
4068	58°06'34"		S 45°08'51" E
4060			
4040	35°30'47"		S 67°44'38" E
4020	14°47'47"		S 88°32'38" E
4000	354°54'22"		N 71°38'57" E
Tie 8		Line 4000	
BS 15			
3534	354°33'40"		N 71°18'15" E


CKCD0024
Seismic Shots
8-14-87
Strack @ Sta 15
Partly Cloudy 65°
DIETZGEN NO. 384-3

1

4068		301° 39' 33"	S 18° 24' 04" W
4060		303° 23' 57"	S 20° 08' 30" W
4040		310° 17' 18"	S 27° 01' 53" W
4020		327° 11' 06"	S 43° 55' 41" W
Begin line 4000		19° 20' 06"	N 83° 55' 19" W
End line 3500			
3534	N 85° 57' 01" W	17° 18' 24"	
3520	N 49° 17' 16" W	53° 58' 15"	
line 3500	N 26° 30' 49" W	74° 46' 36"	
10036	N 89° 02' 28" W	14° 12' 57"	
10,020	N 53° 07' 28" W	50° 07' 57"	
10,000	N 30° 41' 04" W	72° 34' 21"	
line 10,000			
3036	S 89° 39' 47" W	12° 55' 12"	Jim Missed
3020	N 44° 34' 30" W	58° 31' 42"	
3000	N 25° 13' 43" W	78° 01' 42"	
line 3000			
End line 2500			
2540		74° 38' 24"	N 28° 37' 01" W
2520		Missed	
2510		90° 20' 48"	N 12° 54' 37" W
line 2500			
T@15			
BS@8			

1

DIETZGEN NO. 364-3

354° 33' 40"

354 34 19

340° 29' 47"

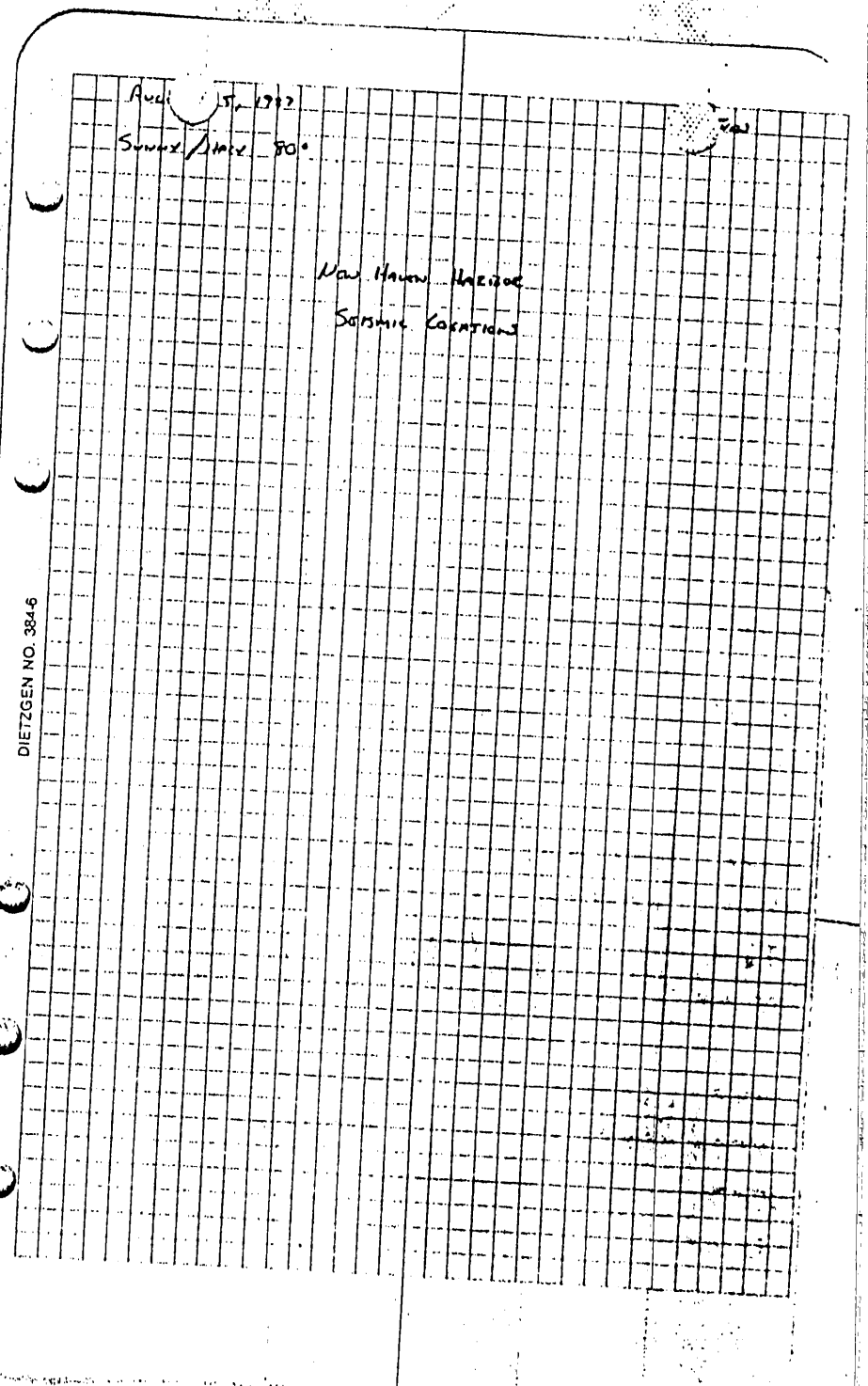
326° 56' 30"

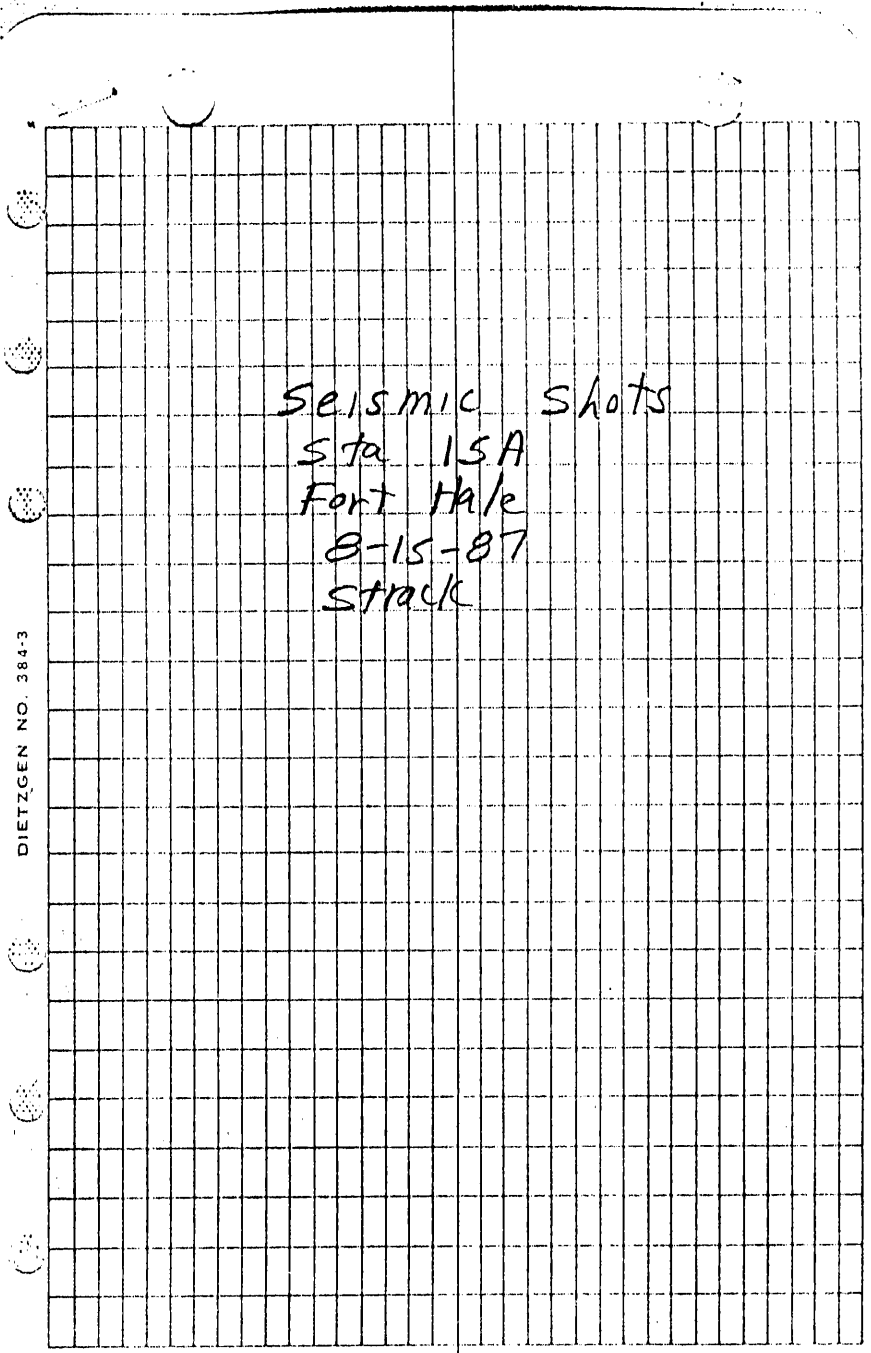
329° 07' 03" Jim

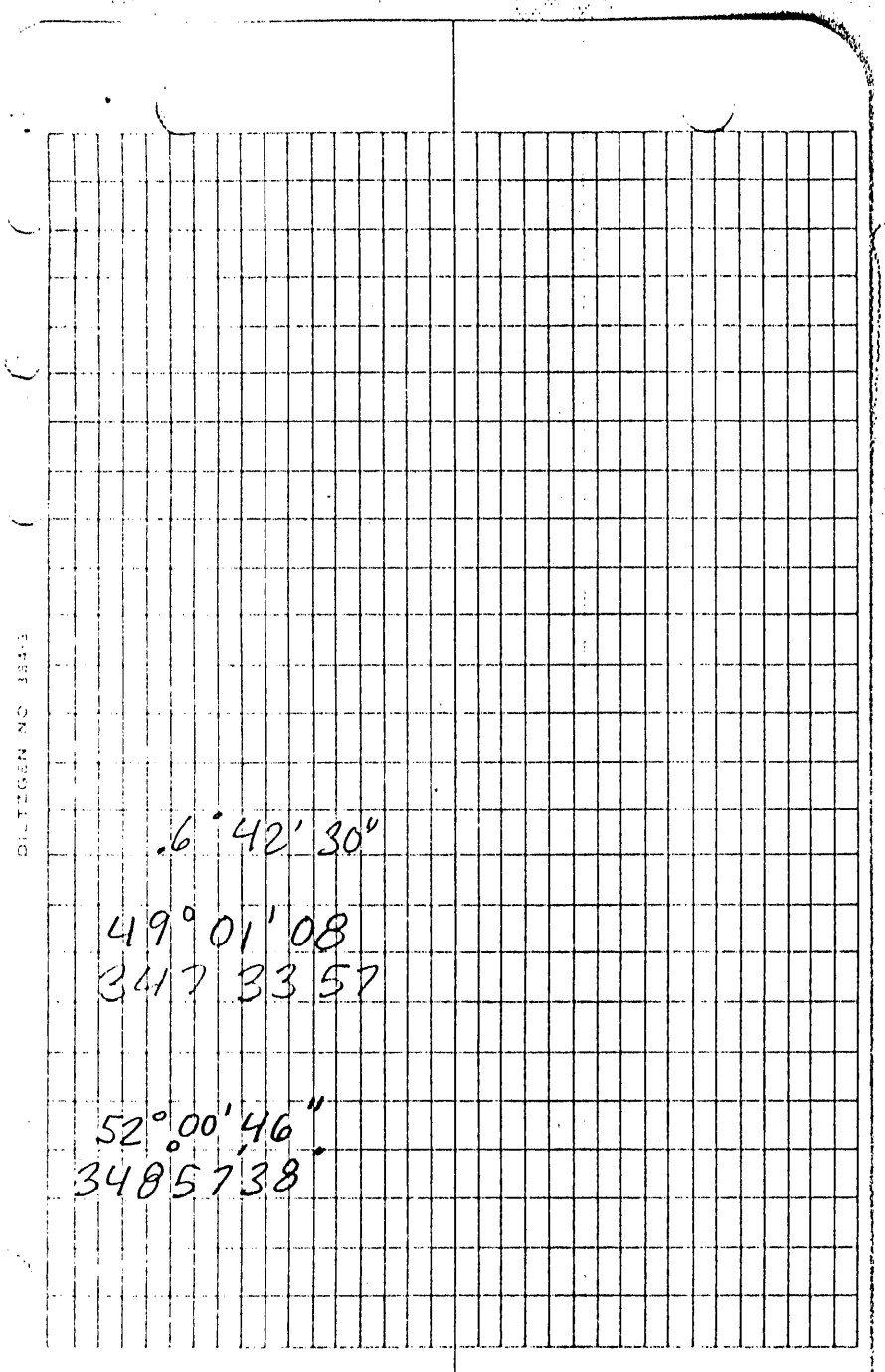
328° 29' 34" Jim

311° 59' 03" Jim

STA	AZIMUTH		
11124	55°20'28"		S 42°22'32" E
11100	6°42'30"		N 88°59'25" E
π₂ 8		LINE 11100	
BS 15A			
11066	49°01'07"		S 48°41'58" E
11000	347°33'57"		N 69°50'52" E
π₂ 8		LINE 11000	
BS 15A			
4562	52°00'45"		S 45°42'20" E
4500	348°57'38"		N 71°14'33" E
π₂ 8		LINE 4500	
BS 15A			




Seismic Shots
Sta 15A
Fort Hale
8-15-87
Strack
DIETZGEN NO. 384-3



.6°42'30"

49°01'08

347 33 57

52°00'46"

348 57 38"

End 11100

11024 300°54'42" S 23°11'37" W

11100 344°45'06" S 67°02'01" W

Begin line 11100

End line 11000

11066 292°02'48" S 14°19'43" W

11000 34°47'39" N 62°55'26" W

Begin line 11000

~~11000~~ End line 4500

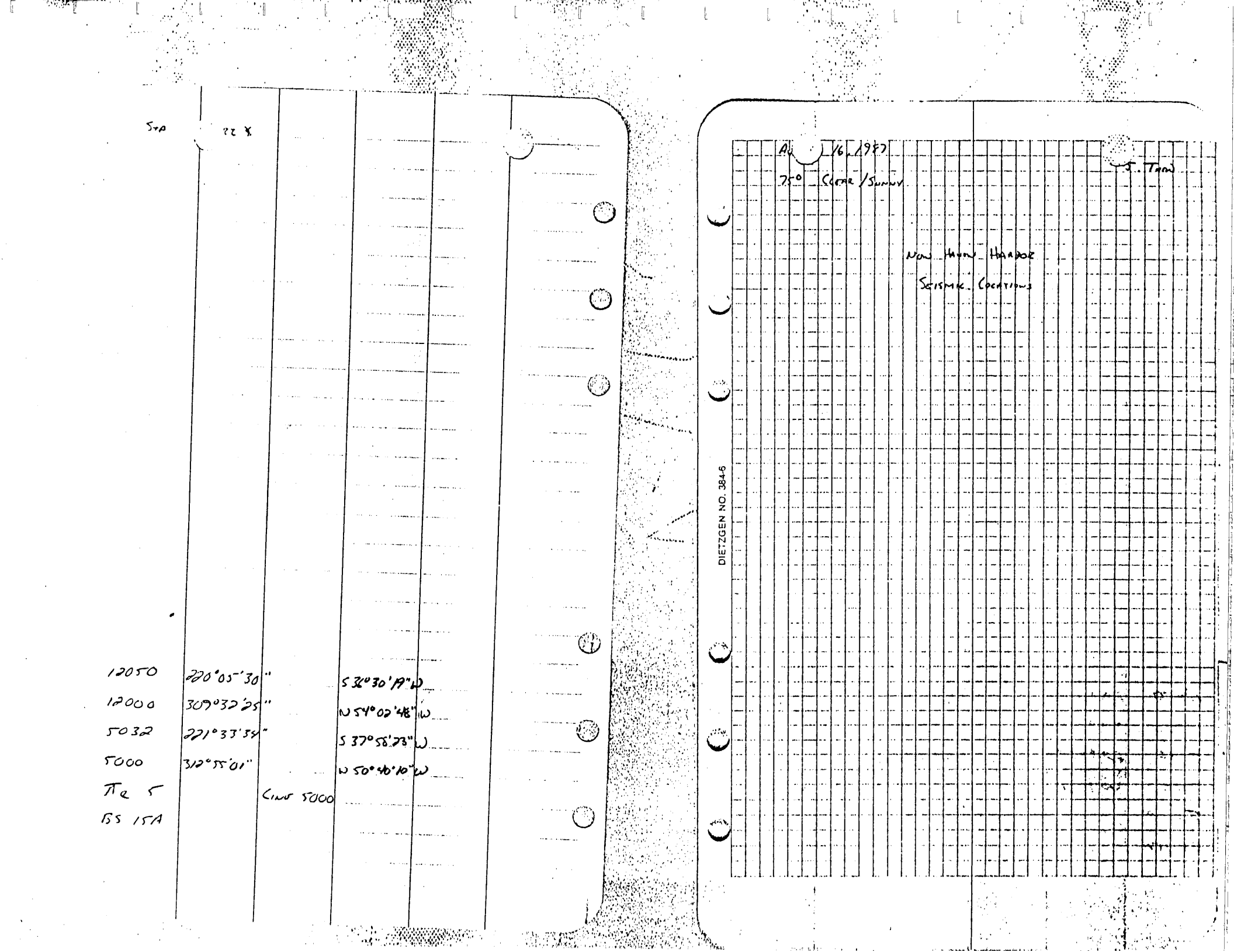
4562 299°31'51" S 21°48'46" W

4500 37°20'18" N 68°22'47" W

Begin line 4500

T @ 15A

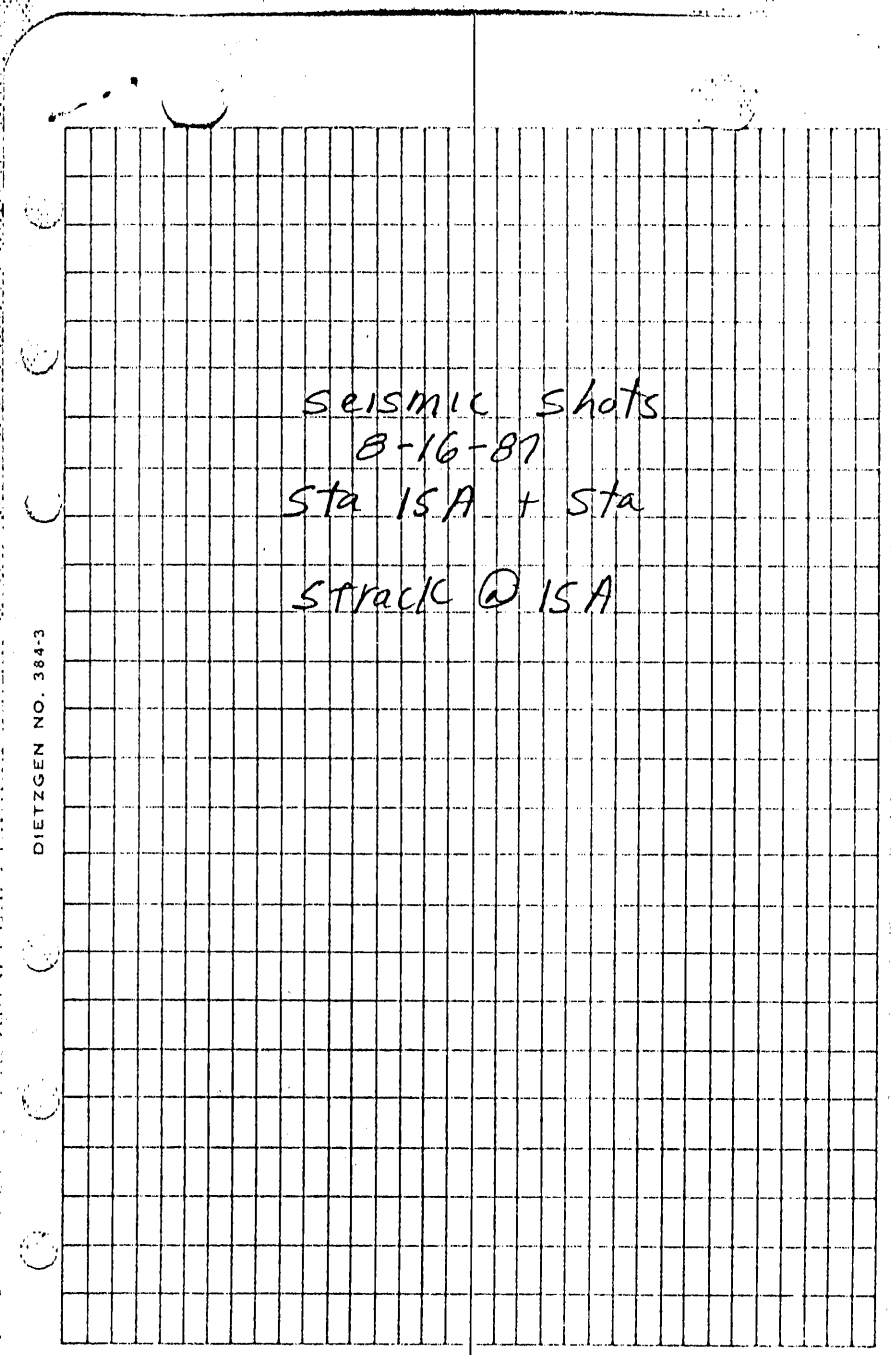
BS @ 8



12050	220°05'30"	S 32°30'19" W
12000	309°32'25"	N 54°02'48" W
5032	221°33'34"	S 37°58'23" W
5000	312°55'01"	N 50°40'10" W

Tie 5 Line 5000

BS 15A


seismic shots
8-16-87
Sta 15A + Sta
Stracic @ 15A
DIETZGEN NO. 384-3

	N	E
5000	153509.3	555042.4
5	151433.81	557560.51
15A	159266.33	557069.58
5032	147125.	554193
15A-5	7841.89	53°35'11"E
12000	153572.7	554621.9
12050	146019.7	553552.4

DIETZGEN NO. 384-3

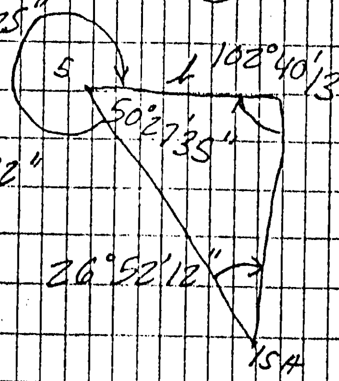
12050 18°28'00" S14°52'49"W
12000 26°52'12" S23°17'01"W
Begin line 12000
End line 5000 57"
5032 16°54'~~57~~" S13°19'46"W
5000 23°01'12" S19°26'01"W
Begin line 5000
T@15A
BS@

220° 05' 30"
2°
309° 32' 25"

221° 33' 34"
312° 55' 01"

7847.89 S 3°35'11"

$\frac{7847.89}{\sin 102°40'13"} = \frac{3635.52 \; b}{\sin 26°52'12"}$



5 — 151433.81 — 557560.51

N54°02'46"W 3635.52 + 2134.54 − 2942.92

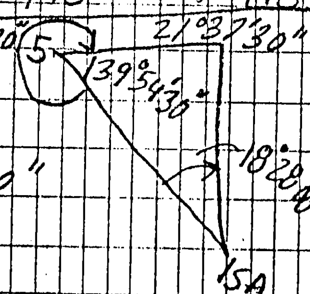
12,000 — 153568.35 — 554617.59

153572.7 — 554621.9

+4.3 — +4.3

13,714.31 220°05'30"

$\frac{7847.89}{\sin 21°37'30"} = \frac{6745.29 \; b}{\sin 18°28'00"}$



5 — 151433.81 — 557560.51

S 36°30'19"W 6745.29 − 5421.88 − 4012.75

12,050 — 146011.93 — 553547.76

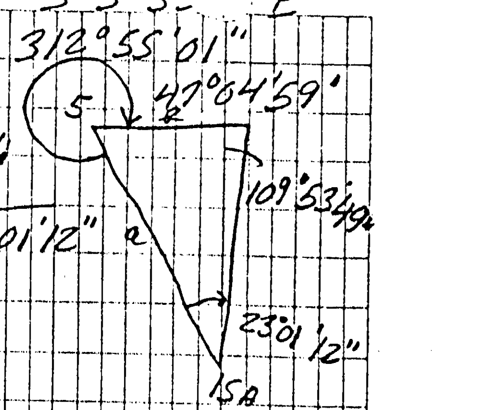
146019.7 — 553552.4

7.8 — 4.6

7847.89 S 3°3 "E

312°55'01"

$\frac{7847.89}{\sin 109°53'49"} = \frac{3263.76 \; b}{\sin 23°01'12"}$ a



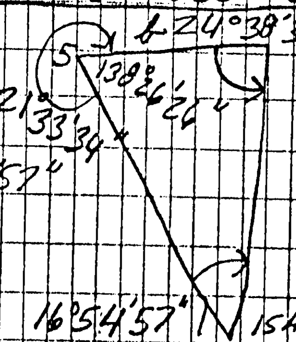
5 — 151433.81 — 557560.51

N50°40'10"W 3263.76 +2068.55 − 2524.53

5000 — 153502.36 — 555035.98

153509.3 — 555042.4

$\frac{7847.89}{\sin 24°38'37"} = \frac{5476.31 \; b}{\sin 16°54'57"}$



5 — 151433.81 — 557560.51

S37°58'23"W 5476.31 − 4316.98 − 3369.52

5032 — 147116.83 — 554190.99

147125 — 554193

DIETZGEN NO. 384-3

Aug(?) 7, 1997

Sonic(?) / Wacy 85°

S. Thao(?)

NEW HAVEN HARBOR

SEISMIC LOCATION

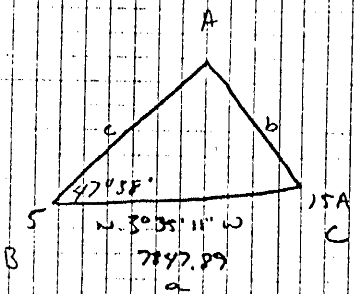
DIETZGEN NO. 384-6

STA				
	'RL 7			
5500	312°22'00"			
To 5		Line 5500	N51°13'11"W	
BS 15A				

5500

24° 16"
312° 00"

DAUG
Jm



$$\frac{7847.89}{\sin 107°29'54"} = \frac{b}{\sin 47°38'} = \frac{c}{\sin 24°52'06"}$$

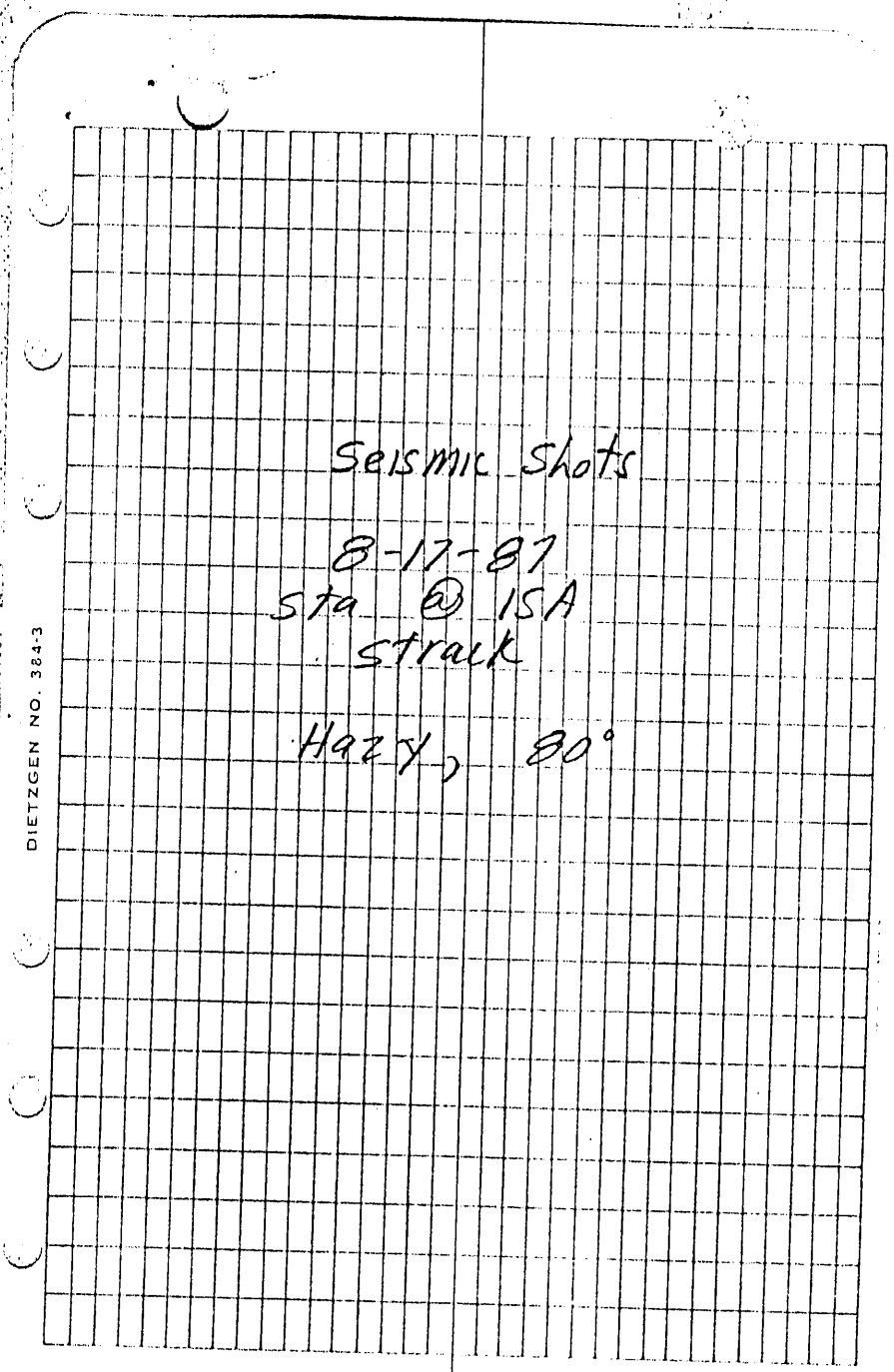
6079.73   3460.44

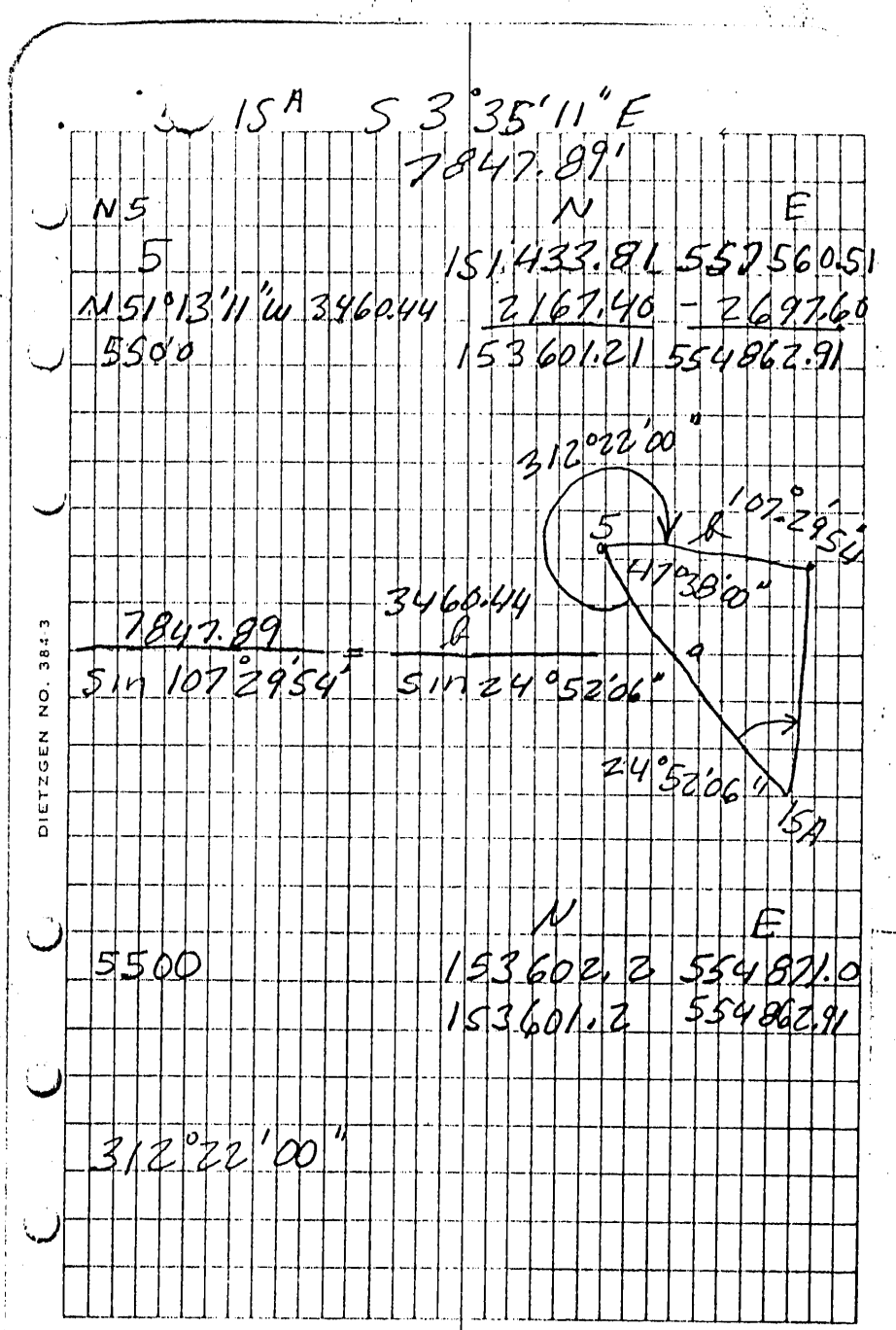
5
N 51°13'11" W   3460.44

5500

	151433.81	557560.51
	2167.40	2677.60
	153601.2	554862.91
WESTON	153662.2	554871

DIETZGEN NO. 3845


Seismic Shots
8-17-87
Sta @ 15A
Strauk
Hazy, 80°
DIETZGEN NO. 384-3



5500 24°52'06" S 21°16'55" W
Begin line - 5500
T@15A
LS@5

STA			
111 -33	340°30'09"		
111-1	5°30'29"	LINE 111	
110 - 33	340°18'15"		
110 -1	5°24'0"	LINE 110	
109 - 33	337°25'00"		BAD COMMUNICATIONS
109 -1	5°04'17"	LINE 109	
107-11	1°10'21"		
1	7°36'57"		
TTc 1 BS TRANSPONDER		LINE 107	

August 21, 1987

Sunny 75°

NW Haven Harbor

Seismic Locations

J. Tan

DIETZGEN NO. 384-6

August [illegible], 1957
80° Sunny

[illegible]
D. Strack
D. Carlson

New Haven Harbor
Tide Recordings

Time	±	Location	Elevation
12:40	+2.6	S-1	1.75
12:30	Level	S-1	1.49
12:20	-.19	S-1	1.3
12:10	-.39	S-1	1.10
12:00 P.M.	-.60	S-1	.89
11:50	-.79	S-1	.70
11:40	-1.00	S-1	.49
11:30	-1.34	S-1	.15
11:20	-1.55	S-1	-.06
11:10	-1.83	S-1	-.34
11:00	-2.13	S-1	-.64
10:50	-2.37	S-1	-.88
10:40	-2.60	S-1	-1.11
10:30	-2.85	S-1	-1.36
10:20	-3.10	S-1	-1.61
10:10	-3.46	S-1	-1.97
10:00	-3.76	S-1	-2.27
9:50	-4.05	S-1	-2.56
9:40	-4.36	S-1	-2.87
9:30	-4.65	S-1	-3.16
9:20	-4.96	S-1	-3.47
9:10	-5.24	S-1	-3.75
9:00 A.M.	-5.55	S-1	-4.06
DST			

DIETZGEN NO. 384-5

Time	±	Location	Elev
7:00	-6.8	S-1	-5.31
6:50	-6.60	S-1	-5.11
6:40	-6.44	S-1	-4.95
6:30	-6.30	S-1	-4.81
6:20	-6.05	S-1	-4.56
6:10	-5.85	S-1	-4.36
6:00	-5.61	S-1	-4.12
5:50	-5.32	S-1	-3.83
5:40	-5.10	S-1	-3.61
5:30	-4.86	S-1	-3.37
5:20	-4.59	S-1	-3.10
5:10	-4.37	S-1	-2.88
5:00	-4.04	S-1	-2.55

Time	±	Location	Elev.
4:50	-3.78	S-1	-2.29
4:40	-3.48	S-1	-1.99
4:30	-3.25	S-1	-1.76
4:20	-2.94	S-1	-1.45
4:10	-2.65	S-1	-1.16
4:00	-2.36	S-1	-.87
3:50	-2.08	S-1	-.59
3:40	-1.74	S-1	-.25
3:30	-1.51	S-1	-.02
3:20	-1.17	S-1	.32
3:10	-.94	S-1	.55
3:00	-.68	S-1	.81
2:50	-.35	S-1	1.14
2:40	-.16	S-1	1.33
2:30	+.15	S-1	1.64
2:20	+.35	S-1	1.84
2:10	+.50	S-1	1.99
2:00	+.60	S-1	2.09
1:50	+.70	S-1	2.19
1:40	+.70	S-1	2.19
1:30	+.80	S-1	2.29
1:20	+.70	S-1	2.19
1:10	+.60	S-1	2.09
1:00	+.55	S-1	2.04
12:50	+.40	S-1	1.89

Aug. 12 1957

80° Clear, Breezy

J. Thew
D. Stack
D. Carlson

New Haven Harbor
Tidal Readings

DIETZGEN NO 3845

Time	±	Location	Elevation
1:00	-.28	S-1	1.21
12:50	-.49	S-1	1.00
12:40	-.75	S-1	.74
12:30	-1.08	S-1	.41
12:20	-1.22	S-1	.27
12:10	-1.44	S-1	.05
12:00	-1.70	S-1	-.21
11:50	-1.91	S-1	-.42
11:40	-2.15	S-1	-.66
11:30	-2.40	S-1	-.91
11:20	-2.62	S-1	-1.13
11:10	-2.92	S-1	-1.43
11:00	-3.17	S-1	-1.68
10:50	-3.49	S-1	-2.00
10:40	-3.78	S-1	-2.29
10:30	-4.15	S-1	-2.66
10:20	-4.45	S-1	-2.96
10:10	-4.72	S-1	-3.23
10:00	-4.97	S-1	-3.48
9:50	-5.28	S-1	-3.79
9:40	-5.59	S-1	-4.10
9:30	-5.92	S-1	-4.43
9:20	-6.18	S-1	-4.69
9:10	-6.46	S-1	-4.97
9:00 AM DST	-6.70	S-1	-5.21

Time		±	Location	Elevation	
5:00					
4:50					
4:40					
4:30					
4:20					
4:10		-1.6	S-1	-.11	
4:00		-.75	S-1	.74	
3:50		-.48	S-1	1.01	
3:40		-.24	S-1	1.24	
3:30		+.05	S-1	1.54	
3:20		+.26	S-1	1.75	
3:10		+.48	S-1	1.97	
3:00		+.60	S-1	2.09	
2:50		+.75	S-1	2.24	
2:40		+.80	S-1	2.29	
2:30		+.94	S-1	2.43	
2:20		+.90	S-1	2.39	
2:10		+.90	S-1	2.39	
2:00		+.85	S-1	2.34	
1:50		+.70	S-1	2.19	
1:40		+.55	S-1	2.04	
1:30		+.35	S-1	1.84	
1:20		+.18	S-1	1.67	
1:10		-.10	S-1	1.39	

Time		t	Location	Elevation
12:40		-1.91	S-1	-.42
12:30		-2.14	S-1	-.65
12:20		-2.42	S-1	-.93
12:10		-2.64	S-1	-1.15
12:00		-2.86	S-1	-1.37
11:50		-3.18	S-1	-1.67
11:40		-3.44	S-1	-1.95
11:30		-3.74	S-1	-2.25
11:20		-3.96	S-1	-2.47
11:10		-4.24	S-1	-2.75
11:00		-4.53	S-1	-3.04
10:50		-4.78	S-1	-3.29
10:40		-5.07	S-1	-3.58
10:30		-5.32	S-1	-3.83
10:20		-5.63	S-1	-4.14
10:10		-5.86	S-1	-4.37
10:00		-6.04	S-1	-4.55
9:50		-6.24	S-1	-4.75
9:40		-6.46	S-1	-4.97
9:30		-6.58	S-1	-5.09
9:20		-6.71	S-1	-5.22
9:10		-6.76	S-1	-5.27
9:00		-6.85	S-1	-5.36
8:50		-6.82	S-1	-5.33
8:40 AM DST		-6.79	S-1	-5.30

Aug. 13 1987

Clear, Breezy

J. Thow
D. Stack
D. Carlson

New Haven Harbor
Tidal Reading

DIETZGEN NO. 3846

Time	t	Location	Elevation
4:00			
3:50	+.28	S-1	1.77
3:40	+.44	S-1	3.96
3:30	+.54	S-1	2.03
3:20	+.65	S-1	2.14
3:10	+.80	S-1	2.29
3:00	+.70	S-1	2.19
2:50	+.60	S-1	2.09
2:40	+.45	S-1	1.94
2:30	+.30	S-1	1.79
2:20	+.10	S-1	1.59
2:10	-.09	S-1	1.40
2:00	-.25	S-1	1.24
1:50	-.50	S-1	.99
1:40	-.79	S-1	.70
1:30	-.71	S-1	.58
1:20	-1.00	S-1	.49
1:10	-1.22	S-1	.27
1:00	-1.46	S-1	.03
12:50	-1.76	S-1	-.27

Time	±	Location	Elevation
1:00	-2.70	S-1	-1.21
12:50	-2.91	S-1	-1.42
12:40	-3.18	S-1	-1.69
12:30	-3.42	S-1	-1.93
12:20	-3.72	S-1	-2.23
12:10	-4.04	S-1	-2.55
12:00	-4.26	S-1	-2.77
11:50	-4.50	S-1	-3.01
11:40	-4.68	S-1	-3.19
11:30	-4.91	S-1	-3.42
11:20	-5.10	S-1	-3.61
11:10	-5.40	S-1	-3.91
11:00	-5.64	S-1	-4.15
10:50	-5.88	S-1	-4.39
10:40	-6.04	S-1	-4.55
10:30	-6.20	S-1	-4.71
10:20	-6.28	S-1	-4.79
10:10	-6.39	S-1	-4.90
10:00	-6.45	S-1	-4.96
9:50	-6.56	S-1	-5.07
9:40	-6.60	S-1	-5.11
9:30	-6.57	S-1	-5.08
9:20	-6.57	S-1	-5.08
9:10	-6.42	S-1	-4.93
9:00 PM DST	-6.25	S-1	-4.76

Aug. 14, 1982
Clear, Breezy

J. Thew
D. Stuck
D. Cochran

New Haven Harbor
Tidal Recordings

DIETZGEN NO. 384-6

Time		t	Location	Elevation	
4:00					
3:50		+.30		1.79	
3:40		+.26	S-1	1.75	
3:30		+.18	S-1	1.67	
3:20		+.08	S-1	1.57	
3:10		-.05	S-1	1.44	
3:00		-.26	S-1	1.23	
2:50		-.42	S-1	1.07	
2:40		-.63	S-1	.86	
2:30		-.81	S-1	.68	
2:20		-.97	S-1	.52	
2:10		-1.11	S-1	.38	
2:00		-1.26	S-1	.23	
1:50		-1.59	S-1	-.10	
1:40		-1.82	S-1	-.33	
1:30		-2.11	S-1	-.62	
1:20		-2.34	S-1	-.85	
1:10		-2.50	S-1	-1.01	

Aug. 15 1987
Hazy, Windy

J. Thew
D. Stroke
D. Carlson

New Haven Harbor
Tidal Recordings

DIETZGEN NO. 3848

Time	±	Location	Elevation
12:20	-4.85	S-1	-3.36
12:10	-5.06	S-1	-3.57
12:00	-5.24	S-1	-3.75
11:50	-5.39	S-1	-3.90
11:40	-5.52	S-1	-4.03
11:30	-5.76	S-1	-4.27
11:20	-5.90	S-1	-4.41
11:10	-5.98	S-1	-4.49
11:00	-6.05	S-1	-4.56
10:50	-6.10	S-1	-4.61
10:40	-6.16	S-1	-4.67 ~~-4.68~~
10:30	-6.30	S-1	-4.81
10:20	-6.22	S-1	-4.73
10:10	-6.15	S-1	-4.66
10:00	-6.10	S-1	-4.61
9:50	-5.98	S-1	-4.49
9:40	-5.88	S-1	-4.39
9:30	-5.80	S-1	-4.31
9:20	-5.70	S-1	-4.21 ~~-4.23~~
9:10	-5.51	S-1	-4.02
9:00	-5.37	S-1	-3.88
8:50	-5.23	S-1	-3.74
8:40	-5.00	S-1	-3.51
8:30	-4.85	S-1	-3.36
8:20 AM DST	-4.64	S-1	-3.15

Time	±	Location	Elevation	*
3:00				
2:50				
2:40				
2:30	-1,88	S-1	-.39	
2:20	-2,10	S-1	-.61	
2:10	-2.32	S-1	-.83	
2:00	-2.54	S-1	-1.05	
1:50	-2.81	S-1	-1.32	
1:40	-2.96	S-1	-1.47	
1:30	-3.23	S-1	-1.74	
1:20	-3.42	S-1	-1.93	
1:10	-3.65	S-1	-2.16	
1:00	-3.99	S-1	-2.50	
12:50	-4.17	S-1	-2.68	
12:40	-4.35	S-1	-2.86	
12:30	-4.64	S-1	-3.15	

Aug 16 1987
Clear, Windy

J. Thew
D. Stack
D. Cadrin

New Haven Harbor
Tidal Recording

DIETZGEN NO 384-5

Time		±	Location	Elevation
12:00				
11:50				
11:40		-5.80	S-1	-4.31
11:30		-5.82	S-1	-4.33
11:20		-5.87	S-1	-4.38
11:10		-5.80	S-1	-4.31
11:00		-5.74	S-1	-4.25
10:50		-5.70	S-1	-4.21
10:40		-5.69	S-1	-4.20
10:30		-5.50	S-1	-4.01
10:20		-5.37	S-1	-3.88
10:10		-5.30	S-1	-3.81
10:00		-5.15	S-1	-3.66
9:50		-5.04	S-1	-3.55
9:40		-4.87	S-1	-3.38
9:30		-4.70	S-1	-3.21
9:20		-4.57	S-1	-3.08
9:10		-4.42	S-1	-2.93
9:00		-4.26	S-1	-2.77
8:50		-4.08	S-1	-2.59
8:40		-3.92	S-1	-2.43
8:30		-3.72	S-1	-2.23
8:20 AM DST		-3.44	S-1	-1.95

Time	±	Location	Elevation
1:00	-5.48	S-1	-3.99
12:50	-5.59	S-1	-4.10
12:40	-5.60	S-1	-4.11
12:30	-5.57	S-1	-4.07
12:20	-5.55	S-1	-4.06
12:10	-5.55	S-1	-4.06
12:00	-5.53	S-1	-4.04
11:50	-5.51	S-1	-4.02
11:40	-5.37	S-1	-3.88
11:30	-5.29	S-1	-3.80
11:20	-5.21	S-1	-3.72
11:10	-5.05	S-1	-3.56
11:00	-4.92	S-1	-3.43
10:50	-4.81	S-1	-3.32
10:40	-4.72	S-1	-3.23
10:30	-4.51	S-1	-3.02
10:20	-4.42	S-1	-2.93
10:10	-4.27	S-1	-2.78
10:00	-4.14	S-1	-2.65
9:50	-3.92	S-1	-2.43
9:40	-3.72	S-1	-2.23
9:30	-3.53	S-1	-2.04
9:20	-3.34	S-1	-1.85
9:10	-3.22	S-1	-1.73
9:00 AM DST	-3.05	S-1	-1.56

Aug. 17 1983
Clear, Breezy

J. Thew
O. Stack
D. Carlson

New Haven Harbor
Tidal Recordings

Time	I	Location	Elevation
5:00			
4:50			
4:40			
4:30	-2.01	S-1	-.52
4:20	-2.13	S-1	-.64
4:10	-2.22	S-1	-.73
4:00	-2.44	S-1	-.95
3:50	-2.66	S-1	-1.17
3:40	-2.79	S-1	-1.30
3:30	-2.92	S-1	-1.43
3:20	-3.14	S-1	-1.65
3:10	-3.33	S-1	1.84
3:00	-3.52	S-1	-2.03
2:50	-3.75	S-1	-2.26
2:40	-3.96	S-1	-2.47
2:30	-4.12	S-1	-2.63
2:20	-4.30	S-1	-2.81
2:10	-4.56	S-1	-3.07
2:00	-4.68	S-1	-3.19
1:50	-4.86	S-1	-3.37
1:40	-4.95	S-1	-3.46 ~~-3.05~~
1:30	-5.08	S-1	-3.59
1:20	-5.25	S-1	-3.76
1:10	-5.38	S-1	-3.89

Aug. 18 1987
Clear, Breezy

J. Thew
D. Stack
D. Carlson

New Haven Harbor
Tidal Recordings

Time	±	Location	Elevation
12:40	-5.19	S-1	-7.31
12:30	-5.10	S-1	-3.61
12:20	-5.00	S-1	-3.51
12:10	-4.88	S-1	-3.39
12:00	-4.76	S-1	-3.27
11:50	-4.64	S-1	-3.15
11:40	-4.46	S-1	-2.97
11:30	-4.32	S-1	-2.83
11:20	-4.20	S-1	-2.71
11:10	-4.06	S-1	-2.57
11:00	-3.91	S-1	-2.42
10:50	-3.70	S-1	-2.21
10:40	-3.52	S-1	-2.03
10:30	-3.36	S-1	-1.87
10:20	-3.21	S-1	-1.72
10:10	-3.07	S-1	-1.58
10:00	2.90	S-1	-1.41
9:50	-2.73	S-1	-1.24
9:40	-2.56	S-1	-1.07
9:30	-2.38	S-1	-.89
9:20	-2.24	S-1	-.75
9:10	-2.08	S-1	-.59
9:00	1.78	S-1	-.49
8:50	1.86	S-1	-.31
8:40	1.65	S-1	-.16

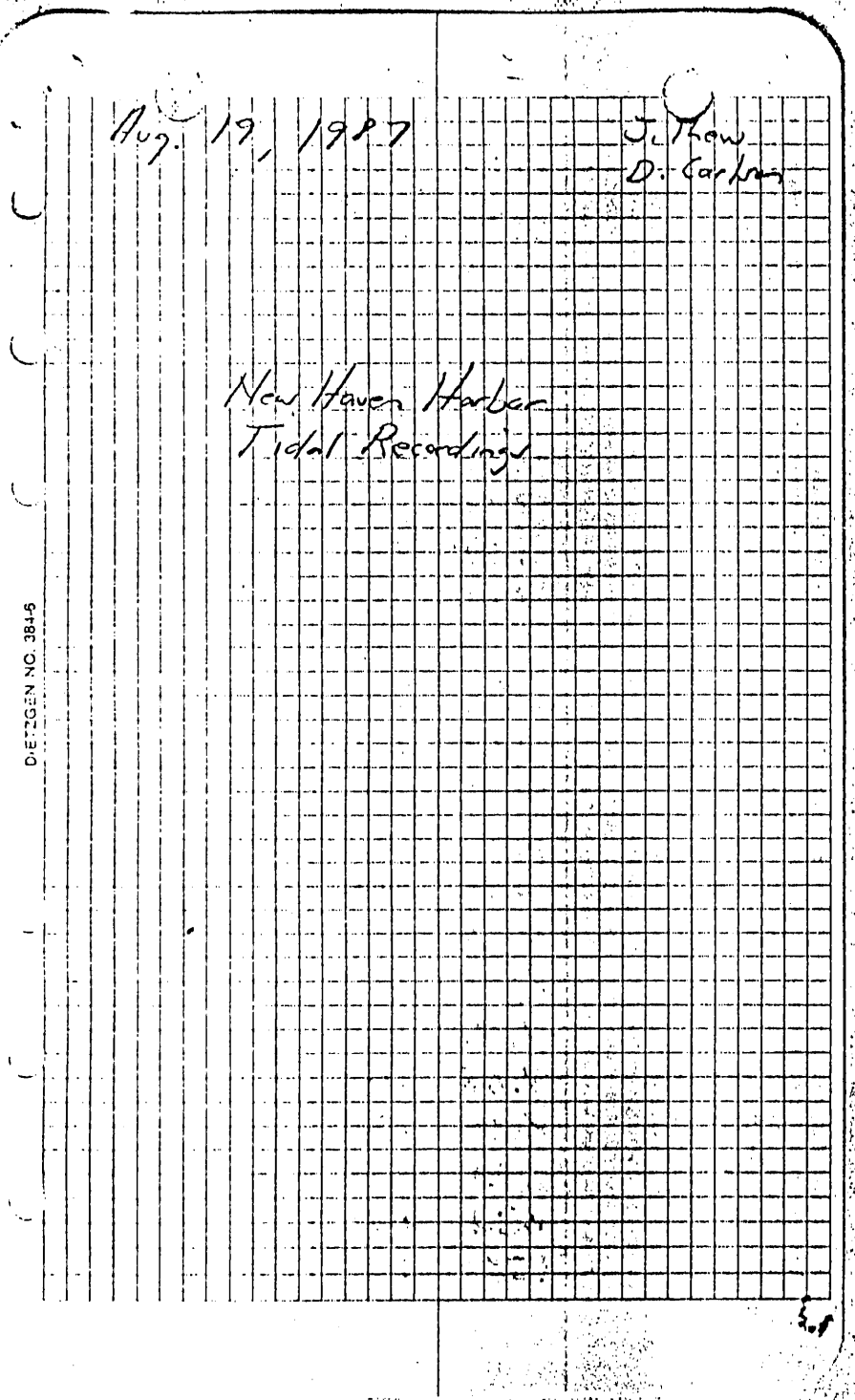
DIETZGEN NO. 3846

Time	±	Location	Elevation	'
2:00				
1:50				
1:40				
1:30	-5.46	S-1	-3.97	
1:20	-5.41	S-1	-3.92	
1:10	-5.35	S-1	-3.86	
1:00	-5.28	S-1	-3.79	
12:50	-5.24	S-1	-3.75	

Aug. 19, 1987

J. Thew
D. Carlson

New Haven Harbor
Tidal Recordings



Time	±	Location	Elevation
1:00	-4.68	S-1	-3.19
12:50	-4.60	S-1	-3.11
12:40	-4.44	S-1	-2.95
12:30	-4.36	S-1	-2.87
12:20	-4.16	S-1	-4.53
12:10	-4.04	S-1	-4.41
12:00	-3.87	S-1	-4.24
11:50	-3.64	S-1	-4.01
11:40	-3.50	S-1	-3.87
11:30	-3.35	S-1	-1.86
11:20	-3.23	S-1	-1.74
11:10	-3.08	S-1	-1.59
11:00	-2.86	S-1	-1.37
10:50	-2.68	S-1	-1.19
10:40	-2.52	S-1	-103
10:30	-2.30	S-1	-.81
10:20	-2.16	S-1	-.67
10:10	-2.04	S-1	-.55
10:00	-1.94	S-1	-.45
9:50	-1.79	S-1	-.30
9:40	-1.63	S-1	-.14
9:30	-1.51	S-1	-.02
9:20	-1.40	S-1	.09
9:10	-1.32	S-1	36
9:00 AM DST	-1.30	S-1	.19

Time	±	Location	Elevation
4:00	-	S-1	
3:50	-4.69	S-1	-3.2
3:40	-4.90	S-1	-3.41
3:30	-5.05	S-1	-3.56
3:20	-5.17	S-1	-3.68
3:10	-5.22	S-1	-3.73
3:00	-5.24	S-1	-3.75
2:50	-5.25	S-1	-3.76
2:40	-5.27	S-1	-3.78
2:30	-5.37	S-1	-3.88
2:20	-5.41	S-1	-3.92
2:10	-5.36	S-1	-3.87
2:00	-5.30	S-1	-3.81
1:50	-5.24	S-1	-3.75
1:40	-5.19	S-1	-3.70
1:30	-5.04	S-1	-3.55
1:20	-5.00	S-1	-3.51
1:10	-4.92	S-1	-3.43

Aug. 20, 1987
Clear, calm

J. Thaw
D Carlson

New Haven Harbor
Tidal Recordings

Time	±	Location	Elevation
12:50	-3.87	S-1	-2.38
12:40	-3.66	S-1	-2.17
12:30	-3.48	S-1	-1.99
12:20	-3.26	S-1	-1.77
12:10	-3.13	S-1	-1.64
12:00	-2.98	S-1	-1.49
11:50	-2.78	S-1	-1.29
11:40	-2.65	S-1	-1.16
11:30	-2.42	S-1	-.93
11:20	-2.22	S-1	-.73
11:10	-2.06	S-1	-.57
11:00	-1.92	S-1	-.43
10:50	-1.76	S-1	-.27
10:40	-1.56	S-1	-.07
10:30	-1.42	S-1	.07
10:20	-1.38	S-1	.11
10:10	-1.30	S-1	.19
10:00	-1.16	S-1	.33
9:50	-1.10	S-1	.39
9:40	-1.03	S-1	.46
9:30	-.99	S-1	.50
9:20	-.99	S-1	.50
9:10	-.96	S-1	.53
9:00	-1.02	S-1	.47
8:50	-1.16	S-1	.33

DIETZGEN NO 384-6

Time	t	Location	Elevation
5:00			
4:50			
4:40			
4:30			
4:20	-5.40	S-1	-3.91
4:10	-5.49	S-1	-4.00
4:00	-5.53	S-1	-4.04
3:50	-5.52	S-1	-4.03
3:40	-5.52	S-1	-4.03
3:30	-5.54	S-1	-4.05
3:20	-5.55	S-1	-4.06
3:10	-5.50	S-1	-4.01
3:00	-5.48	S-1	-3.99
2:50	-5.46	S-1	-3.97
2:40	-5.42	S-1	-3.73
2:30	-5.31	S-1	-3.82
2:20	-5.17	S-1	-3.68
2:10	-5.05	S-1	-3.56
2:00	-4.89	S-1	-3.40
1:50	-4.74	S-1	-3.25
1:40	-4.64	S-1	-3.15
1:30	-4.59	S-1	-3.10
1:20	-4.39	S-1	-2.90
1:10	-4.23	S-1	-2.74
1:00	-4.09	S-1	-2.60

Time	t	Location	Elev.
12:30	-2.60	S-1	-1.11
12:20	-2.48	S-1	-.99
12:10	-2.30	S-1	-.81
12:00	-2.06	S-1	-.57
11:50	-1.87	S-1	-.38
11:40	-1.72	S-1	-.23
11:30	-1.60	S-1	-.11
11:20	-1.48	S-1	.01
11:10	-1.38	S-1	.11
11:00	-1.27	S-1	.22
10:50	-1.20	S-1	.29
10:40	-1.14	S-1	.35
10:30	-1.03	S-1	.46
10:20	-.98	S-1	.51
10:10	-1.00	S-1	.49
10:00	-1.04	S-1	.45
9:50	-1.12	S-1	.37
9:40	-1.17	S-1	.32
9:30	-1.26	S-1	.23
9:20	-1.37	S-1	.12
9:10	-1.52	S-1	-.03
9:00	-1.69	S-1	-.20
8:50	-1.90	S-1	-.41
8:40	-1.98	S-1	-.49
8:30	-2.16	S-1	-.67

Aug. 21, 1987
Clear, Calm

J. Thow
D. Carlson

DIETZGEN NO. 364-6

Time		±	Location	Elevation	
2:00					
1:50					
1:40		-3.96	S-1	-2.47	
1:30		-3.80	S-1	-2.31	
1:20		-3.62	S-1	-2.13	
1:10		-3.42	S-1	-1.93	
1:00		-3.20	S-1	-1.71	
12:50		-2.98	S-1	-1.49	
12:40		-2.74	S-1	-1.25	

11-1-87
Elevations for Tides
Correction 2.4 to
mean low water from
Sea Level Datum 1929

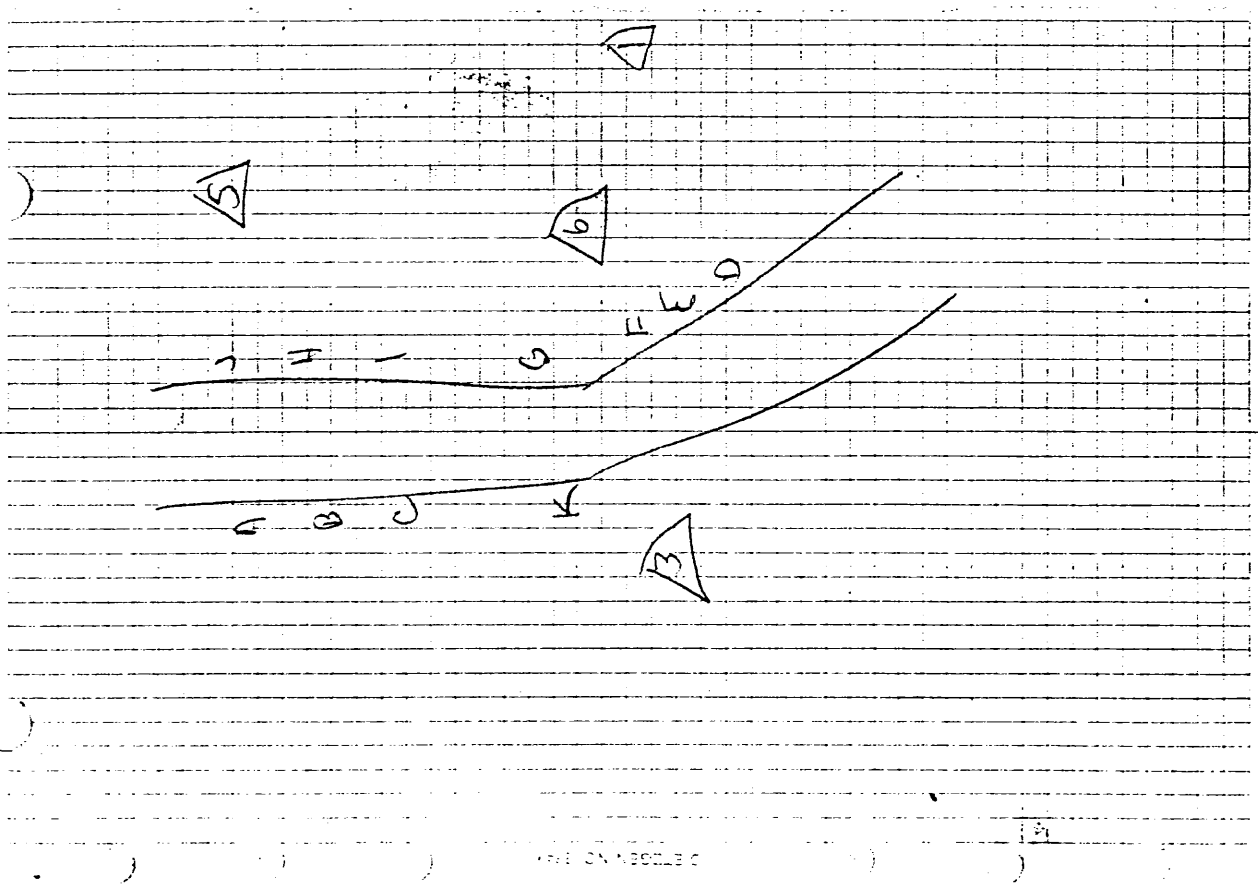
Sta @ Jetty Headwall
@ Light House 7.85 MLW

Sta @ Marina Headwall
6.57 MLW

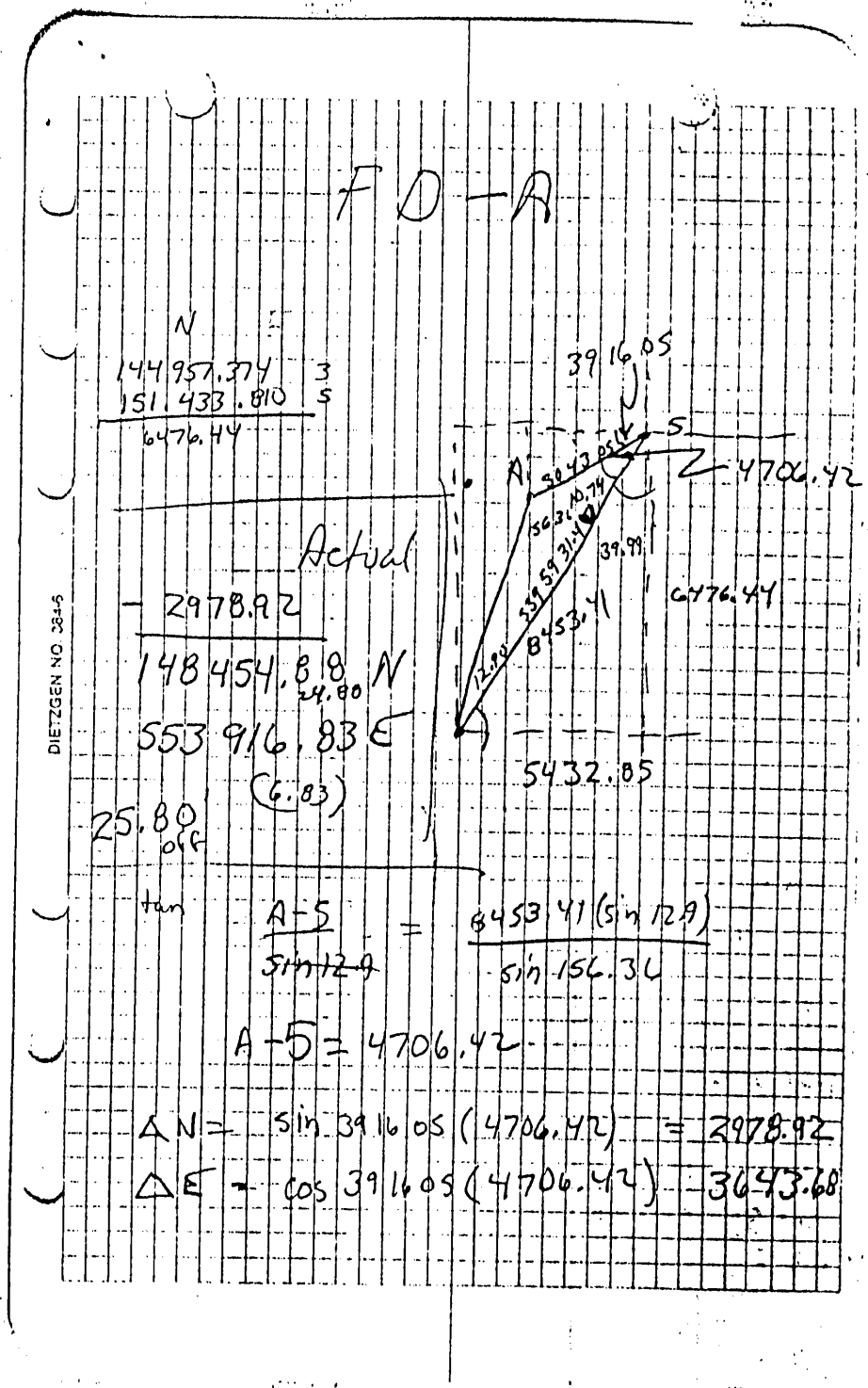
Sta	Date	Time	Reading	MLW	mLW Elev
Lt House				7.85	
A	11-1-87	12:48 PM	-7.85		0.00
A		1:22 PM	-8.25		-0.40
A		1:38 PM	-8.25		-0.46
A		2:02 PM	-8.15		-0.30
A		2:23 PM	-7.85		0.00
A		2:48 PM	-7.40		+ 0.45
A		4:19 PM	-5.35		+ ~~3.50~~ 3.50
A		4:35 PM	-4.95		+ 2.90
A		4:47 PM	-4.65		+ 3.20
Marina JCHY				6.57	
A	11-1-87		-2.80		+ 3.77
Lt. House				7.85	
G	11-2-87	12:47 PM	-6.95		+0.90
G		1:35 PM	-7.85		0.00
G		2:00 PM	-8.15		-0.30 ~~-0.70~~
G		2:31 PM	-8.25		-0.40
Marina		?		6.57	
		4:00 PM	-5.95		+ 0.62
Lt Hous				7.85	
		4:36 PM	-6.40		+ 1.45
		5:05 PM	-5.60		+ 2.25

Sta	Date	time	Reading	Elev Above MLW	MLW Elev.
Marina				6.57	

	Dbl FR	351°13'21"	355 36 40
FS@G	FR	355°36'33"	
T@5		~~351°13'21"~~	
BS@3			
			347°07'00"
Steve			
	Dbl FR	21°28'48"	10°44'24"
FS A	FR	10°43'12"	
T@5			
BS@3			


A
B
C
D
E
F
G
H
I
J
1
2
3
4
5
6
7

Sta 2				
	172 05 20			
	172 04 20	28 40 43		
Sta 2	28 40 20			
	143 23 40			
Set 1 Reps	28 40 40			
Stat 2				
Stat 3	09 10 10	18 20 25	9 10 12 ~~9 10 22~~	
BS 5				
Reset 6				
11/8/87				
Reset #2				
~~FD-6~~	28 40 10			
FD-6	14 15 30			
Stat 3	9 ~~36 40~~ 37 40		9	37 45
BS 5			2 14	15 30 75 90



	Date	Time	(-)Rod	Point EL.	
Fence G-FD	11/8/87	9:55AM	3.65	7.85	4.20
		10:00	3.50		4.35
		10:15	3.20		4.65

		2592420		
		2231400	2231403	
				136° 45' 58" interior
		259 24 10		
		2231410	2231402	22° 27' 00"
		269 24 40	2231.07	
		223 13 50		
	R3	3094220		
	R2	8628 10		
	R1	2231410		
	3	309 42 10		
	2	86 27 50		
	1	223 13 50		
	R3	309 42 10		
	R2	86 28 20		
	R1	223 14 00		
	3	309 41 50		
	2	86 28 00		
Sta 3	1	2231410		
Lighthouse at 5				
BS 16 Fort Hale				

	BS	HI	FS	EL							
Sta 199 BM 4	5.88	10.27		4.39					1929 MSL	MLW	
TP 1	8.22	17.53	0.96	9.31							
TP 2	10.50 ~~10.51~~	27.35	0.68	16.85							
TP 3	0.75	20.77	7.33	20.02							
TP 4	14.34	33.82	1.29	19.48	corner ocean view						
TP 5	~~8.19~~ 8.20	41.37	0.65	33.17							
TP 6	6.63	32.64	~~15.45~~ 15.46	26.01							
TP 7 Lighthouse Rd	0.52	27.75	5.41	27.23							
					TP 2 PK Lot - N side channel seawall	4.19	12.98		7.53	5.45 (2.4) 8.79	7.85
					TP 3 Bait Shop top Block	4.49	11.86		7.69	4.17 (7.4) 6.57	6.57
									90 05 40	269 59 45	
									90 05 40	269 59 50	
									90 05 45	269 59 45	L
					Tat tend BS -	IH =	5.22				

	S	HI	FS	EL
TP 8	7.61	26.71		19.10
TP 1			6.59	20.12
TP 1	1.68	21.80		
TP 2			13.01	8.79
TP 2	4.23	13.02		
TP 3 Boat Ramp			5.65	7.37
TP 3	5.58	12.95		
TP 2			4.18	8.
TP 2	12.76			
TP 1			1.43	
TP 1	7.13			
TP 8			8.15	
Σ =	(38.99)		(39.01)	

	S	HI	FS	EL	
		27.75			
TP 8 curb in PK lot	8.55		8.65	19.10	
TP 7	4.86		0.43		
TP 6	15.36		6.08		
TP 5	0.76		8.11		
TP 4	2.16		14.45		
TP 3	7.26		1.58		1.85
TP 2	0.84		10.43		
TP 1	1.90		8.38		
BM			6.85		
	96.73		~~16.85~~	96.74	

	BS	HI	FS	El	
Brass cap	6.575				
top wall	~~3.5~~		3.555		
top sign			0.665		
Coast Guard Station					
BM	3.32	18.38		15.06	MLW
Gauge			2.49	16.09	

	BS	HI	FS	EL
TP3 Boat Rental	8.06	15.43		7.37
TP1 condos			4.75	10.68
TP1	4.84	15.52		
TP2 and condos			9.96	5.56
TP2	5.15	10.71		
TP3			1.60	9.11
TP ~~4~~3	8.89	18.00		
TP4			6.49	11.51
TP4	8.54	20.05		
Brass Plate tp			10.29	9.76
wall			7.26	12.79
top sign			4.39	15.66
Brass Plate	10.43 ~~10.50~~	20.19		~~11.50~~
~~Ref. Plate~~				
TP 4			8.69	11.50
TP4	6.12	17.62		
TP3			8.50	9.12

TP3	7.99	11.11		9.12
TP2			5.53	5.58
TP2	9.89	15.47		
TP1			4.78	10.69
TP1	4.72	15.41		
TP3 Boat Ramp			8.01	7.40
	68.63 (204.35)		68.60 (204.35)	

Sta	BS	HI	FS	Elev	Morgan Brass Cap. mean Sea level 1929 Datum
Morgan	3.905	13.665		9.76	
E. Bk wtr			3.84	9.825	Paint mark

Morgan

NO + Used

9.76
+HI 4.61
HI 14.37
− HI 5.22
+ 1.78
Elev. @ Bk wtr. 10.93

Steve vert ∠ 90°05'40"
Ave. 90°02'58" Z 269°59'45"
HI 5.22

Ave 89°57'13" (89°57'39")
R 270°02'21"
S.D. 2195.38 D 89°56'48"
Ave. 89°57'11"
S.D. 2195.38 R 270°02'30"
FS @ E. Bk wtr. D 89°56'52"
TI @ Morgan HI = 4.61

10-30-87
CK CD 0024
Reciprical Trig. level
Stack @ Morgan Point
Chatell @ East Bk. wtr.
10-29-87
Stack - 10-30-87
cl. T. H

DIETZGEN NO. 384-3

Vert ∠ 89°57'13" H = 2195.38
Dist 2195.38 V = +1.78'

~~Vert ∠ 89°57'30"~~
~~Dist~~
Vert ∠ 90°02'58" H = 2195.38
Dist. 2195.38 V = -1.89

1

10-31

✠1-7-3	6x	246°48'09"	341°08'02"
	1x	341°08'00"	
		used 341°08'3.5"	
✠1-7-3	6x	246°48'30"	341°08'05"
	1x	341°08'06"	
✠1-7-3		246°47'39"	341°07'56"
		341°07'45"	not used
		~~341°08'06"~~	
#6 Rev		200°05'42"	153°20'57"
#1 Dir		153°20'54"	
✠7-~~8~~1-3			
		200°05'48"	153°20'58"
#6 Rev		153°20'54"	
#1 Dir		~~153°21'06"~~	
FS. Lud Blk wtr.			
✠7-~~8~~1-3			
T@Morgan			
BS@			

10-31-87
Triangulation To
Establish Point on
Lud. Blk wtr.
Strack T Morgan
Chattell T

DIETZGEN NO. 384-3

2

10-31

5-16-3	• R x6 D x1	134°42'00" 22°27'00"	22°27'00"
5-16-3	R x6 D x1	134°41'42" 22°27'00"	
5-16-3	R x6 D x1	134°42'06" 22°27'06"	22°27'01"

DIETZGEN NO. 384-3

23°11'25"
23°11'20" = ∡ from tripod on Ludington BK wtr

Steve
3.77
3.90

Dave
3.905

c. Tidal Elevations

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 12, 1987

AUGUST 12, 1987

TIME	ELEVATION
9:00AM	-5.21
9:10	-4.97
9:20	-4.69
9:30	-4.43
9:40	-4.10
9:50	-3.79
10:00	-3.48
10:10	-3.23
10:20	-2.96
10:30	-2.66
10:40	-2.29
10:50	-2.00
11:00	-1.68
11:10	-1.43
11:20	-1.13
11:30	- .91
11:40	- .66
11:50	- .42
12:00PM	- .21
12:10	.05
12:20	.27
12:30	.41
12:40	.74
12:50	1.00
1:00	1.21
1:10	1.39
1:20	1.67
1:30	1.84
1:40	2.04
1:50	2.19
2:00	2.34
2:10	2.39
2:20	2.39
2:30	2.43
2:40	2.29
2:50	2.24
3:00	2.09
3:10	1.97
3:20	1.75
3:30	1.54
3:40	1.24
3:50	1.01
4:00	.74
4:10	- .11
4:20	
4:30	
4:40	
4:50	
5:00	

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 13, 1987

TIME	ELEVATION
8:40AM	-5.30
8:50	-5.33
9:00	-5.36
9:10	-5.27
9:20	-5.22
9:30	-5.09
9:40	-4.97
9:50	-4.75
10:00	-4.55
10:10	-4.37
10:20	-4.14
10:30	-3.83
10:40	-3.58
10:50	-3.29
11:00	-3.04
11:10	-2.75
11:20	-2.47
11:30	-2.25
11:40	-1.95
11:50	-1.69
12:00PM	-1.37
12:10	-1.15
12:20	- .93
12:30	- .65
12:40	- .42
12:50	- .27
1:00	.03
1:10	.27
1:20	.49
1:30	.58
1:40	.70
1:50	.99
2:00	1.24
2:10	1.40
2:20	1.59
2:30	1.79
2:40	1.94
2:50	2.09
3:00	2.19
3:10	2.29
3:20	2.14
3:30	2.03
3:40	3.96
3:50	1.77

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 14, 1987

TIME	ELEVATIONS
9:00AM	-4.76
9:10	-4.93
9:20	-5.08
9:30	-5.08
9:40	-5.11
9:50	-5.07
10:00	-4.96
10:10	-4.90
10:20	-4.79
10:30	-4.71
10:40	-4.55
10:50	-4.39
11:00	-4.15
11:10	-3.91
11:20	-3.61
11:30	-3.42
11:40	-3.19
11:50	-3.01
12:00PM	-2.77
12:10	-2.55
12:20	-2.23
12:30	-1.93
12:40	-1.69
12:50	-1.42
1:00	-1.21
1:10	-1.01
1:20	- .85
1:30	- .62
1:40	- .33
1:50	- .10
2:00	.23
2:10	.38
2:20	.52
2:30	.68
2:40	.86
2:50	1.07
3:00	1.23
3:10	1.44
3:20	1.57
3:30	1.67
3:40	1.75
3:50	1.79

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 15, 1987

TIME	ELEVATION
8:20AM	-3.15
8:30	-3.36
8:40	-3.51
8:50	-3.74
9:00	-3.88
9:10	-4.02
9:20	-4.21
9:30	-4.31
9:40	-4.39
9:50	-4.49
10:00	-4.61
10:10	-4.66
10:20	-4.73
10:30	-4.81
10:40	-4.67
10:50	-4.61
11:00	-4.56
11:10	-4.49
11:20	-4.41
11:30	-4.27
11:40	-4.03
11:50	-3.90
12:00PM	-3.75
12:10	-3.57
12:20	-3.36
12:30	-3.15
12:40	-2.86
12:50	-2.68
1:00	-2.50
1:10	-2.16
1:20	-1.93
1:30	-1.74
1:40	-1.47
1:50	-1.32
2:00	-1.05
2:10	- .83
2:20	- .61
2:30	- .39

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 16, 1987

TIME	ELEVATION
8:20AM	-1.95
8:30	-2.23
8:40	-2.43
8:50	-2.59
9:00	-2.77
9:10	-2.93
9:20	-3.08
9:30	-3.21
9:40	-3.38
9:50	-3.55
10:00	-3.66
10:10	-3.81
10:20	-3.88
10:30	-4.01
10:40	-4.20
10:50	-4.21
11:00	-4.25
11:10	-4.31
11:20	-4.38
11:30	-4.33
11:40	-4.31

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 17, 1987

TIME	ELEVATION
9:00AM	-1.56
9:10	-1.73
9:20	-1.85
9:30	-2.04
9:40	-2.23
9:50	-2.43
10:00	-2.65
10:10	-2.78
10:20	-2.93
10:30	-3.02
10:40	-3.23
10:50	-3.32
11:00	-3.43
11:10	-3.56
11:20	-3.72
11:30	-3.80
11:40	-3.88
11:50	-4.02
12:00PM	-4.04
12:10	-4.06
12:20	-4.06
12:30	-4.07
12:40	-4.11
12:50	-4.10
1:00	-3.99
1:10	-3.89
1:20	-3.76
1:30	-3.59
1:40	-3.46
1:50	-3.37
2:00	-3.19
2:10	-3.07
2:20	-2.81
2:30	-2.63
2:40	-2.47
2:50	-2.26
3:00	-2.03
3:10	1.84
3:20	-1.65
3:30	-1.43
3:40	-1.30
3:50	-1.17
4:00	- .95
4:10	- .73
4:20	- .64
4:30	- .52

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 18, 1987

TIME	ELEVATION
8:40AM	- .16
8:50	- .31
9:00	- .49
9:10	- .59
9:20	- .75
9:30	- .89
9:40	-1.07
9:50	-1.24
10:00	-1.41
10:10	-1.58
10:20	-1.72
10:30	-1.87
10:40	-2.03
10:50	-2.21
11:00	-2.42
11:10	-2.57
11:20	-2.71
11:30	-2.83
11:40	-2.97
11:50	-3.15
12:00PM	-3.27
12:10	-3.39
12:20	-3.51
12:30	-3.61
12:40	-7.31
12:50	-3.75
1:00	-3.79
1:10	-3.86
1:20	-3.92
1:30	-3.97

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 19, 1987

TIME	ELEVATION
9:00AM	.19
9:10	.36
9:20	.09
9:30	- .02
9:40	- .14
9:50	- .30
10:00	- .45
10:10	- .55
10:20	- .67
10:30	- .81
10:40	-1.03
10:50	-1.19
11:00	-1.37
11:10	-1.59
11:20	-1.74
11:30	-1.86
11:40	-3.87
11:50	-4.01
12:00PM	-4.24
12:10	-4.41
12:20	-4.53
12:30	-2.87
12:40	-2.95
12:50	-3.11
1:00	-3.19
1:10	-3.43
1:20	-3.51
1:30	-3.55
1:40	-3.70
1:50	-3.75
2:00	-3.81
2:10	-3.87
2:20	-3.92
2:30	-3.88
2:40	-3.78
2:50	-3.76
3:00	-3.75
3:10	-3.73
3:20	-3.68
3:30	-3.56
3:40	-3.41
3:50	-3.20

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 20, 1987

TIME	ELEVATION
8:50AM	.33
9:00	.47
9:10	.53
9:20	.50
9:30	.50
9:40	.46
9:50	.39
10:00	.33
10:10	.19
10:20	.11
10:30	.07
10:40	- .07
10:50	- .27
11:00	- .43
11:10	- .57
11:20	- .73
11:30	- .93
11:40	-1.16
11:50	-1.29
12:00PM	-1.49
12:10	-1.64
12:20	-1.77
12:30	-1.99
12:40	-2.17
12:50	-2.38
1:00	-2.60
1:10	-2.74
1:20	-2.90
1:30	-3.10
1:40	-3.15
1:50	-3.25
2:00	-3.40
2:10	-3.56
2:20	-3.68
2:30	-3.82
2:40	-3.93
2:50	-3.97
3:00	-3.99
3:10	-4.01
3:20	-4.06
3:30	-4.05
3:40	-4.03
3:50	-4.03
4:00	-4.04
4:10	-4.00
4:20	-3.91

NEW HAVEN HARBOR

TIDAL ELEVATIONS

AUGUST 21, 1987

TIME	ELEVATION
8:30AM	- .67
8:40	- .49
8:50	- .41
9:00	- .20
9:10	- .03
9:20	.12
9:30	.23
9:40	.32
9:50	.37
10:00	.45
10:10	.49
10:20	.51
10:30	.46
10:40	.35
10:50	.29
11:00	.22
11:10	.11
11:20	.01
11:30	- .11
11:40	- .23
11:50	- .38
12:00PM	- .57
12:10	- .81
12:20	- .99
12:30	-1.11
12:40	-1.25
12:50	-1.49
1:00	-1.71
1:10	-1.93
1:20	-2.13
1:30	-2.31
1:40	-2.47